THE VETERINARY RECORD

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 45. NOVEMBER 6, 1943 VOL. 55.

N.V.M.A. CONFERENCE DISCUSSIONS

(*Continued from page* 424)

There was again a full attendance of members, delegates and visitors at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1, when the conference held by the National Veterinary Medical Association, in conjunction with the sixty-first annual general meeting, was continued on Thursday, September 30th, 1943, with the President, Dr. W. R. Wooldridge, in the chair.

The PRESIDENT: We resume our discussions this morning, taking as our theme "The Improvement of Livestock," and I have great pleasure in calling upon Professor Rae, of the University of Reading. (Applause.)

No. 2—The Improvement of Livestock

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As an introduction to our discussion on means to be taken for the improvement of livestock, I want first to remind you of the predominant position in our agricultural economy which the livestock industry holds. By livestock industry I mean livestock and livestock products, *i.e.*, cattle, sheep, pigs and poultry, and their products, beef, mutton, pork, bacon, milk, butter, cheese, eggs, wool, etc. It is true that under the stress of war millions of extra acres of land have been ploughed up and tremendous increases have been required of those crops such as wheat, barley, potatoes, sugar beet, etc., which are capable of direct human consumption and do not require to be converted into human food by our farm animals. A small island country carrying the heavy population which ours supports is dependent for much of its food on overseas sources which means shipping. The outbreak of war, therefore, calls for a policy which will immediately begin to produce the maximum amount of home-grown food measured in terms of calories. The relatively low return from a hundred acres of land devoted to livestock production, in terms of human food (calories only), as compared with the same area given over to the production of, say, wheat or potatoes, is the justification of this policy.

It must also be realised that in pre-war days our livestock industry was dependent to a considerable degree on a plentiful and reasonably priced supply of imported animal feeding stuffs. Our total imports of feeding stuffs in the period preceding the war amounted to some 10 million tons and cost about £50 million per annum to import. This dependence on imported supplies was greatest in the case of specialised pig and poultry producers, considerable in the case of most milk producers and least in the case of sheep farmers. With the progress of the war the demands on shipping increased, as also did the dangers, and the volume of imported feeding stuffs rapidly dropped with the consequence that early in 1940 a national scheme for the rationing of animal feeding stuffs was introduced. A priority list was made, with dairy cows and milk production at the top and pigs and poultry at the bottom on account of their almost total dependence on concentrated foods, largely imported. The present position with our livestock, therefore, is that numbers of dairy cows have been maintained and, in fact, show a small increase; there is some reduction in the numbers of beef, cattle and sheep and a very considerable reduction in the numbers of pigs and poultry. This position is simply what most people, with a knowledge of agriculture, would have forecast in any discussion in pre-war days on what would happen if war should arise.

There is no doubt, however, that our large livestock population, especially where combined with well-balanced systems of farming, had built up large reserves of soil fertility and that much of the success of our very creditable war-time crop production has been due to a realisation or cashing of that fertility.

No declaration of post-war policy for agriculture has yet been made by the Government, but it seems a safe guess that home agriculture will be required to produce as much as possible of that group of foods generally included under the head of "fresh" or "perishable." Under this category come, at least, milk and eggs of the livestock products. In my opinion, livestock production must still remain our dominant form of agriculture. We have in our country large areas of hill and other land not suitable for intensive arable cultivation. That much of this land can be improved by drainage, manuring, re-seeding, fencing, provision of water, etc., has now been amply demonstrated. Sound policies for sheep and cattle breeding which provide opportunities for a reasonable financial return are the best advocates for bringing about such improvement with, in consequence, a marked increase in the stock-carrying capacities of those areas. Again, even in our arable areas we have much land which cannot be kept in good heart or profitable cultivation without livestock; the value of folded flocks of sheep and the effect from the application of the tramped in "muck" from the bullock yard, do not need any further emphasis here. In short, the maintenance of much of our land in a state of reasonable fertility cannot be achieved without livestock.

The statement that the future of farming in this country lies in the main with the livestock side of the industry does not imply that we should revert to large areas under so-called permanent grass. We have large areas which by climate and elevation are only suitable for grass, and we have other marginal land which only war-time urgency can justify as arable. For the greater part of our farm lands, however, the system of temporary leys or alternate husbandry is to a greater or less extent suitable. One great advantage of the war to British farming may be the fact that the control of cropping, exercised by County War Agricultural Committees, has introduced this system and its obvious values to farmers all over the country in a much shorter time than could probably have been achieved in any other way. The system is not new and it has stood the test of time for many generations of Scottish farming. From the point of animal health, there is everything to be said for temporary pastures with their fresh clean grazing, and in the general farm economy it should give increased stock-carrying capacity and the opportunity of cashing the fertility accumulated from the livestock.

For the year 1938 the estimated value of the gross agricultural and horticultural produce in England and Wales was £219·5 millions, of which no less than £154·5 millions, or 70·4 per cent., represented the output of livestock and livestock products. For Northern Ireland the percentage represented by livestock was nearly 80 and for Scotland the figure was between these two. For Great Britain and Northern Ireland, therefore, the output of livestock and livestock products lies somewhere between 70 and 80 per cent. of the total agricultural output. These figures have been subjected to criticism in that they are heavily weighted in favour of livestock, for they include the conversion of all imported feeding stuffs into livestock and their products. They also include all those farm crops, oats and other cereals, hay, straw, silage, kale, roots, grass, etc., which instead of being marketed as such are consumed by stock and either walk off the farm on four legs or in these modern days travel to market by the carrier's lorry. Even with these reservations, the figures do show the importance of animal husbandry in British farming.

While I wish to see the development of temporary leys wherever possible and the maintenance of plough land to produce food for livestock to as large an extent as may be practicable, I do not see any possibility of our producing all the food necessary to support a livestock industry equal to our pre-war numbers and, in my opinion, these numbers should, in our post-war plans, be increased. There can be no question as to the desirability, from the national point of view, of increasing as rapidly as possible the per capita consumption of milk, to give only one example. Imported animal feeding stuffs will, therefore, be required in such quantities as we need, and can afford to pay for, and I fail to follow the arguments against the resumption of these imports as soon as opportunities will permit. On the other hand, many farmers, particularly those making a heroic struggle to maintain breeding stocks and some volume of production of pigs and poultry, have been forced to make use of various by-products and other unusual foods. The collection and treatment of household and other edible waste for sale as swill could be extended, and provided the price can be brought down to a competitive level, I see no reason why this form of food should only have a war-time value.

Before passing on to consider livestock improvement schemes in any detail, there is one further general point about the livestock of Britain to which I wish to draw your attention. It is one which may well serve as the "text" for the remainder of this paper. Our country has, on many occasions, been referred to as the "stud farm of the world." This is, I believe, in large measure a true and accurate description. It is certainly true that the best herds and flocks of many other countries, our own Dominions and the

Americas, North and South, as examples, were founded on stock exported from this country, and that we had until the outbreak of the war, a valuable export trade of high quality breeding stock, horses, cattle, pigs and sheep, to a great variety of countries. The parade of prize winners at the Shows of the Royal or Highland Agricultural Societies, gave one a justifiable feeling of pride in our livestock. But did one have the same feeling of pride at the ordinary sale of store cattle, or driving through the country lanes, or looking out of the window of a railway coach? I think not. The truth is that while we undoubtedly have a top strata of very fine livestock, it represents only a small percentage of the total livestock population. Then comes a solid middle of what is generally referred to as good commercial herds, and after that, it has to be admitted, much too big a tail end of inferior unprofitable nondescript stock. As I see it the aim of a sound livestock improvement policy may be summarised as one which should attempt to raise, as rapidly as possible, the level of all the livestock of the country to one as near that of our best herds and flocks as is possible. All farmers are not breeders and the "true breeder's eye" is not given to all and sundry. There will always be outstanding breeders to produce our super livestock and to be an inspiration to others. Nevertheless, our real problem is to get more and more farmers to attempt to be breeders and to adopt some policy in their livestock production suitable to their own individual circumstances. More breeders—used in a wide sense and not confined to pedigree—and less mere multipliers of stock, would appear to be a sound foundation on which to build a progressive livestock improvement policy.

I have no information not available to you all, as to the Government's intentions for livestock, and all I propose to do is to summarise and comment upon some of the schemes at present in existence which have as their object some aspect of livestock improvement. It was probably inevitable that in the first years of the war all the emphasis should be put on crop production and all the official encouragement given to improvements in technique along that one branch of agriculture. The cessation of practically all livestock schemes was regrettable but fortunately some, such as bull licensing, were restored at a comparatively early date. While crop production is still of paramount importance, more emphasis is gradually being placed on the livestock side of farming. Official pronouncements have been made as to the need to raise the general level of our dairy herds and milk production officers have been appointed for that purpose by County War Agricultural Executive Committees. It has also been stated that any further decrease in the number of pigs and poultry is undesirable and that every effort should be made to retain the existing nucleus of breeding stock. Additional food rations are granted for pedigree pigs and to poultry breeders who have been put on the accredited register. A per capita subsidy has been given to hill sheep farmers and attention has been drawn by various interested bodies to the need for some encouragement to folded flocks on the light lands.

It is impossible within the purview of this paper to attempt to deal with all classes of livestock and I shall confine my remarks to dairy cattle and if time permits some reference to pigs.

Dairy Cattle

Even at the risk of being accused of repetition, I wish to put in the forefront the necessity of the individual dairy farmer adopting some policy—he may not give it such a grandiose title, but he must know what his aim is. No one policy is going to suit all conditions. Some producers may adopt the policy of breeding all their replacements and aiming at a self-contained herd. Others, at the other extreme, may decide that they should do no breeding and carry their full cattle complement in mature producing stock. There is much to be said in favour of this latter method in highly rented, intensively farmed areas, but in a properly balanced national policy it should be associated with "attested" areas in rearing districts from which the milk producer could be certain of obtaining good healthy heifers. The attainment of a home bred self-contained herd is the aim of many keen dairy farmers where they have sufficient land and accommodation to rear the necessary young stock. An added interest can be got by adopting a "grading-up" policy. Both the Shorthorn and British Friesian Cattle Societies have such schemes which make it possible for any keen farmer, without the purchase of any pedigree stock except bulls, eventually to get all his animals up to pedigree status and entered in the respective societies' herd books.

A brief outline of the history of the Dairy Shorthorn herd at the University of Reading's farm may illustrate the possibilities in this direction. The herd was founded in 1906 by the purchase of 12 commercial non-pedigree in-calf heifers of Shorthorn type. In 1908 a grading-up policy was inaugurated by the purchase of a pedigree Shorthorn bull. During the following three years a further purchase of 21 heifers in-calf or with calf at foot was made. No cows or heifers have been purchased for the Shorthorn herd since 1911. The grading-up of the herd until every animal was registered in Coates' Herd Book took about 22 years. It is felt that this is not an unreasonably long period in view of all the other aims of milk yield, health, type, etc., which had to be considered. Fourteen years may be regarded as the minimum time required, provided all cows have heifer calves in regular succession—an event most unlikely to happen in practice. This grading-up of the University herd was carried out on a small farm of 120 acres and the herd was maintained at about 18 cows with the necessary following of young stock. During the period of development the herd could be regarded to all intents and purposes as an ordinary commercial herd, for in no way has work been done or expense incurred beyond the means of the average farmer. In fact, the herd was handicapped both by lack of buildings and of land for its unfettered development. The herd was transferred to Sonning in 1935 when the University bought a larger farm and we now have a pedigree Shorthorn herd of some 110 animals. To conclude my outline of our own herd, it may be of interest in passing to record our experiences in regard to tuberculosis and contagious abortion. The Shorthorn herd was first tested for tuberculosis by the subcutaneous test in the spring of 1909, and then twice yearly up to 1912, when the herd was considered free. During those four years 15 animals reacted. From 1912 to 1933 the herd was tested once a year, the subcutaneous test being used. In 1934 the double intradermal test was introduced and twice yearly testing carried out until 1936, and one annual test has been made since that date. The number and frequency of reactors to the tests is as follows:—

1909 to 1912	...	...	...	15	reactors
1918	...	...	...	1	"
1928	...	...	...	5	"
1934	...	...	...	1	"

The total number of reactors between 1909 and 1943 has thus been 22 and of this number the original bought in heifers account for ten. In 1928 one cow that reacted had been sent in a motor lorry to a bull some 50 miles distant and another reactor stood next to her in the cowshed. This may account for the outbreak in this year after the herd had been practically clear for 16 years. There have been no reactors in either the Shorthorn or Friesian herds since 1934. In regard to abortion a cow slipped twin calves in 1925. A blood test was taken and proved positive. It was immediately decided to adopt a policy of inoculation and all cows and heifers were inoculated eight weeks before service with the live vaccine. From that outbreak the last case occurred in January, 1927. Since that date periodic blood tests have been made, always with negative results. In July, 1942, however, a cow gave birth to a premature calf and the blood test gave a positive reaction. All the dairy cows were subsequently submitted to a blood test in early October and four animals gave positive results. Once again inoculation was decided upon and the same procedure adopted as in 1925. During the winter of 1942-43 nine cows and heifers aborted, but no case has occurred since April, and we hope we have again got through this outbreak relatively lightly.

The ideal of a self-contained dairy herd is, however, impossible and impracticable unless milk yields can be maintained or improved on. Unless the home bred heifers, when they join the milkers in the cowsheds, prove to be in the aggregate as good milkers as their mothers, or better, then the milk output from the farm must fall and the whole financial structure of a dairy farm is in jeopardy. The only immediate remedy open to the farmer is to buy in additional milking stock, with the consequent risks of also buying trouble, and the disappearance, at least temporarily, of the self-contained ideal. This maintenance of milk yields, assuming feeding and general management to be efficient, depends to a major extent on the purchase of suitable bulls. The purchase of a herd sire is, or should be, a matter of prime importance to any dairy farmer, but is fundamental to the owner of a self-contained herd. There is still much information which we need from the geneticist and there are serious gaps in our knowledge on milk inheritance. At best the purchase of a young dairy bull is something of a gamble and it is therefore essential to take all the steps necessary to reduce this gamble. The only true economic assessment of the value of a dairy bull is the milk yield of his daughters. A bull who has proved himself in this way should obviously be retained for use as long as he remains active and fertile. From a national point of view it is desirable that the services of any outstanding dairy sires should be made as widely available as possible. One possibility in this direction is artificial insemination on which I have a few remarks to make later. The terms "proven sire" and "progeny tested" are commonly applied to such bulls but these descriptions must be used with care, and only when they are fully justified. It is not enough to state that, say, eight or ten daughters of Bull X yielded on the average so many gallons of milk in their first lactations. It is also essential to know how many of his daughters reached the milking stage and what were the yields of all daughters who did so. To get a true

genetic picture the figures must be entirely unselected and show the spread of the yields and not simply the average of the better yielders. It is not unreasonable to expect that all dairy bulls should have as dams, cows, which in addition to being suitable in conformation, shape of udder, etc., have given satisfactory yields of milk, for their breed, both in quantity and quality. They should also, whenever possible, and one hopes that to an increasing degree it will be possible, have as their sires bulls who have given evidence of their power to transmit to their daughters high milking capacity. I should like to interpolate here the comment that the term " proven sire " as I have interpreted it applies only to the transmission of milk and that it does not follow that a bull which has also been outstandingly successful in other directions in one herd will necessarily be equally successful in another herd with cows of different blood lines and different types. Shape, constitution, colour and many other factors also concern, at least, the pedigree breeder.

I should like now to deal briefly with some of the recent developments which have as their objective the raising of the general level of our dairy herds to a higher degree of efficiency.

National Milk Records

It may be stated quite emphatically that an official scheme of milk recording must form the basis of any policy for the breeding of better dairy stock. The provision of reliable milk and butter fat records of the breeding cows is indispensable in the selection of the next generation of breeding stock. Their use, however, is much wider, and they provide the information necessary for the efficient management of the herd. Without a knowledge of the milk yield of individual cows it is impossible to feed in relation to yield or weed out the uneconomic producers. When weighing is done daily it is also the most valuable indicator of the general health of each cow—a sudden drop in yield by an individual cow at any particular milking is a signal for investigation. Finally, it is the starting-off point in the economics of milk production, necessary as a check on milk output and sales and essential in any investigation of his costs which the farmer may wish to work out.

An official national scheme of milk recording was inaugurated by the Ministry of Agriculture in 1914, and although there was a rapid increase in the number of officially recorded herds in the early years following the cessation of the first world war, progress slowed down and by '937 there were still only some 5,000 recorded herds, representing some 5 per cent. of the total cow population in England and Wales. Nevertheless, it is true that the recorded herds include the best pedigree herds of all dairy breeds and many good commercial herds where a policy of grading up is being carried out.

After a number of meetings between the Milk Board, Ministry of Agriculture and Central Council of Milk Recording Societies, it was decided to set up a National Milk Records Scheme. This took effect on January 1st, 1943, when the Milk Marketing Board, which represents all producers in England and Wales, took over the supervision and development of organised milk recording in England and Wales. The scheme will be organised centrally by the Milk Marketing Board and locally by Committees, based as far as practicable on existing Milk Recording Societies. The Board will arrange for the supply of all necessary forms and registers, collect all levies from members and make all payments for local expenses. The Board will employ and pay the necessary staff and appoint inspectors to supervise the general working of the scheme. The scheme falls into two halves, the senior and junior sections. The senior section is the Milk Recording Scheme as it existed prior to this new development and retains all the features of daily or weekly weighing, comparatively frequent visits by recorders, butter fat testing, ear marking of calves, etc. It is only in the case of the senior section that yields can be certified by the Board for pedigree or sale purposes. The junior scheme was introduced as an attempt to get as large a body of farmers as possible to adopt at least a modified form of recording and in the hope that many would eventually pass on to the full scheme. The junior section of the scheme has been kept as simple as possible and has been limited to the recording of yields only. Participation is optional, although the suggestion has been put forward that it should be made compulsory. All that members are required to do is to weigh the milk of every cow and heifer in milk, on two successive milkings at monthly intervals, and enter the quantities on the sheets supplied by the Board. Recorders will help members at the start and thereafter visit the herd at intervals of about three months. At the end of the year the milk yield of each animal will be totalled and entered in the herd register. If the farmer wishes, the recorder will also take details of his feeding during the winter months and forward this to the Rationing Advisory Officer for the area, who will examine it and send to the farmer such suggestions as may be desirable. I understand that already the number of farmers who have enrolled in the scheme is considerable. It is to be hoped that the number will continue to grow rapidly and that we shall soon have a large proportion of dairy farmers who are taking part in a recording scheme and thus providing themselves with some information as a help to the selection and retention of their best milkers, the disposal of the low yielders, to more economic feeding methods and thus the raising of their own efficiency as dairy farmers.

Classification of Herds or Dairy Herd Survey and Register of Bull Breeding Herds

These two schemes are important parts of the official livestock policy and have great possibilities in the raising of the general level. Those of us who have been engaged in educational work know that in pre-war days our contacts were mainly with a relatively small number of the keener and more enterprising farmers and it was these men who kept in touch with research work and made such use of its findings as could be of value on their own farms. The creation of County War Agricultural Committees, the inspection and classification of every farm in the country and the appointment of increased technical staffs, have presented a golden opportunity to get in touch with all farmers, good and not so good. Also to be blunt, the power of compulsion lurks in the background although it is to the credit of the British farmer that, in the main, it remains there.

The two schemes under discussion are to be operated by the County War Agricultural Committees and in this way will apply to all the dairy farms in the country. A systematic classification of dairy herds can form a sound foundation for whatever superstructure it may be decided to build on the information which it produces. The immediate result will be a survey by competent inspectors of dairy farms and their classification into grades. Concentration of effort can then be directed towards helping, and where necessary stimulating those who are most in need of such help, with a consequent raising of the level of their cattle and their own general efficiency as producers.

The shortage of good bulls is clearly one of the most urgent matters calling for prompt action. The Licensing of Bulls Act, which has now been operating for some years in all parts of the British Isles, was perhaps the most important legislative means ever passed in an attempt to raise the general level throughout the entire country. There would be general agreement that its measure of success has been considerable but the standard accepted for licence can only be gradually raised in accordance with the type and volume of bulls coming forward. Further, it is obvious that such an Act can lift the standard much more quickly in the case of the beef breeds where external conformation can be more exactly related to production and quality, than can be achieved in the dairy breeds. In many cases, with non-pedigree bulls, it has not been possible to relate the bull to be licensed with the yield of its dam, and I understand that the number of dairy or dual-purpose bulls presented for licence who are from officially recorded dams is under 20 per cent. The picture now begins to become clear and what is required is an increase in the number of milk recorded herds, the classification of herds and the adoption of methods whereby bull calves bred in the best herds can be dispersed much more widely throughout the herds of the country. When this has been accomplished the licensing standard can be raised to that much higher level which many stockmen would like to see. The purpose of the register of bull breeding herds is to make arrangements whereby this wide dispersion of good bull calves can be brought about. County War Agricultural Committees have invited farmers with suitable herds to submit them for inspection for this purpose. The herd is then inspected by two qualified judges and cows with the required milk yield, conformation, etc., are accepted as potential bull breeders, having, of course, regard to the stock bull and the yield of his dam. When bull calves are born from such parents the Livestock or Milk Production Officer of the county is notified. It is anticipated that he will gradually build up a list of farmers who will be willing to purchase and rear such calves to become eventually their herd sires. No claim is made that any new principle in breeding is involved but simply that arrangements are being made to enable any farmer, whose herd number is sufficient to justify keeping a bull, to be able to adopt the procedure of good breeders in buying a bull of known parentage, the records of whose performances are available. Too many bulls are still purchased, of whose history little is known and judgment has to be based purely on external conformation which, even if reasonably satisfactory (and it is not always so), is by no means a satisfactory basis on which to purchase the animal on which the future success of the herd so largely depends.

Artificial Insemination

I have previously suggested that the services of outstanding bulls should, from a national point of view, be made available to as large a number of females as possible, and artificial insemination can provide the means to make this possible. In addition, however,

it could meet other requirements, such as that of the small farmer who, often for financial reasons, has a cheap and inferior bull or whose herd is so small that, especially under present circumstances, he is not justified in keeping a bull at all. As will be known to you all, two official stations, Reading and Cambridge, have been set up to investigate the possibilities of artificial insemination on a field scale. The Minister of Agriculture has taken powers to control the use of artificial insemination, and any further official developments will presumably wait until judgment can be passed on the results obtained at Reading and Cambridge. I have some contact with the Reading centre and, although it is early days, we are satisfied with the progress we have made up to date. Personally, I feel that this movement will grow and that at least for dairy stock it has great potentialities. It has grown to large dimensions in the United States with, to judge from reports, very satisfactory results. Like any other innovation in agricultural practice, however, the claims made on its behalf should be restricted to what it can achieve in the way of increased milk production and better stock, and only harm and disappointment will follow if it is hailed as a panacea for all the troubles which beset the milk producer and breeder of dairy stock.

There are two fundamental considerations which are closely connected with any attempts to improve our livestock, namely, health and management, including feeding. Indeed, unless in our general livestock farming we take equal care to effect improvement in these two directions, improvement in livestock breeding is meaningless. I have only time to make passing reference to these two important subjects and, in any case in so far as the health schemes go, you gentlemen are responsible for their operation and know a great deal more about them than I do. I only wish to state that I welcome any developments which aim at prevention and control of disease and congratulate your Association on the initiation of the present scheme to tackle the four major diseases of dairy cattle. I trust that enrolments under the scheme will grow just as rapidly as practical limitations will permit the practitioner to take over more herds.

The relative importance in the running of a first-class dairy herd between breeding, feeding and management could be debated at length. One can, however, state without fear of contradiction that our increased knowledge of breeding practices has given us many animals which are potentially high producers, but that the realisation of those potentialities will only be obtained if our management and feeding of these animals is as perfect as it can be made with our existing knowledge. Further, the high yielding dairy cow is an animal which calls for individual attention and any schemes on paper, for feeding standards or any other point, no matter how perfect they may look, do not displace the skill of the real stockman, farmer or employee. Without such schemes he would be seriously handicapped; with them, combined with his skill and unremitting care, there is the perfect combination.

Pigs

Time will only permit of my raising, briefly, one or two points. Since the introduction of the licensing of bulls in England the suggestion has frequently been made that a similar scheme should apply to boars. Some discussion on this question has arisen recently and the point been made that the present is an opportune time to start the licensing of boars. The pig population has dropped greatly since the outbreak of war and it is argued that if licensing of boars was introduced now when numbers are low, then the effect of a reasonable standard in licensing would be most marked when the population rises rapidly, as it is anticipated it probably will after the war. It is necessary to realise that we have a large number of breeds of pigs in our country and that if we return to pre-war requirements we have at least two very different markets to supply, namely, the small pork carcase and the long lean side suitable to meet the popular demand for that type of bacon. (This diversity both of type of pig and market raises difficulties, which will call for careful consideration in fixing standards.) The same arguments, however, put forward as to the necessity of eliminating the scrub bull, apply to the scrub boar, and there is no doubt that the problem of the too numerous nondescript type of pig should be tackled at the earliest opportunity. I should also like to see after the war the formation of a national recording scheme to carry on and co-ordinate the excellent work which was in progress in some counties before the war. I want recording to take the form of setting up standards of production which would be the desideratum of keen pig producers and not to be interpreted as the making or breaking of spectacular individual records.

One great advantage of a recording scheme is that it gives the producer the information on which to examine and assess the efficiency of his stock and also his own methods of feeding and management. May I give one example? An examination of the data collected by County Pig Recording Societies showed that on the average the number of pigs weaned at eight weeks was less by some 20 to 25 per cent. than the number of pigs born. There was, of course, very considerable spread about this mean, but ignoring the abnormally large litters which no one wants, this is a very serious source of loss, both to the financial results of the individual producers and to the national output of food. If this is the figure in recorded herds it is safe to assume that it is still larger if we could obtain a figure for all herds. Recording makes such information available and the next logical step is to investigate the possible causes. Apart from any specific disease it may, on the part of the pig, be a clumsy or nervous sow, a sow with insufficient yield of milk or low fertility—all matters of breeding. On the part of the producer it may be incorrect feeding, unsuitable housing or some other weak point in general management.

There is considerable variation possible in the system of pig-keeping and the best must be worked out by each producer, having regard to the soil, climatic and other conditions applicable to his own case. It is obviously essential to have first a sound breeding policy and by selection to arrive at a suitable strain, within the breed, of pigs with a high fertility, good mothering and milking qualities in the sows and, in the fattening animals, a satisfactory growth rate both in regard to live weight increase and quality of carcase. With this, however, must go a suitable system of feeding and housing—it is absolutely fundamental in the case of pigs. Most of the Reading University farm consists of light gravel soil, and it is situated in an area of low rainfall. It is therefore suitable for outdoor conditions and the breeding stock run out all the year round. Farrowing takes place in fold units and the feeding pigs are transferred to fattening yards after weaning. The pigs fit into the rotation adopted on one section of the farm, a five-year course which includes two years under grass. Hay is taken the first year and the field is then turned over to the pigs for the following year. In this way they have fresh land each year and the residual benefit for the succeeding crops on our poor light soils is very marked. It has proved a successful system, our rearing losses are small, there is no trouble with "deficiency" diseases and it helps to maintain our soil fertility.

In conclusion, may I stress the necessity for paying even greater attention to the general stamina and health of our livestock, particularly our breeding stock. It is imperative that our systems of production should be kept under constant review to ensure that production is not being obtained at the expense of lowered vitality. The ability to live and produce at an efficient level over a period of years under ordinary farm conditions is the only real test. The relation between nutrition and health or disease is very close—closer, I think, than we sometimes realise. Our knowledge is still imperfect but a tremendous step forward would be taken if we could have our existing knowledge applied on all farms. In my opinion, both the technical agricultural staffs and the veterinary profession have a part to play in this direction and I do not subscribe to the view that the veterinary practitioner should be only a clinician.

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Discussion

The President: We are fortunate in having three distinguished openers of the discussion on the valuable paper we have just heard from Professor Rae, and it is with much pleasure that I call first upon Colonel Curley.

Colonel E. M. Curley, Chief Veterinarian, European Theatre of Operations, United States Army, who was heartily applauded when going forward to open the discussion, said: I wish to take this opportunity to congratulate Professor Rae on the excellence and the comprehensive coverage embodied in his paper. In these days of global visualisation a country which fails in farsightedness, providing means and methods are available, in planning an agricultural policy for a maximum production of farm animal products, is guilty of moral lassitude. It would appear in reading Professor Rae's paper that your country cannot be accused of neglecting this procedure in lending maximum self-aid, thereby indirectly helping other countries through the lessening of otherwise necessary imports. Speaking of this general subject a few days ago, one of our fellow officers, in his own inimitable Tennessee drawl, said that he thought this fellow Hudson was the greatest man in England. (Applause.) When I pressed him for his reason, he replied, "Well, he has taken the land that the gentry has been galloping over following a few hares and has put it to producing valuable food." There is some sense to that remark. (Hear, hear.) Whether you revert to a full or almost entire importing programme again after the war is, of course, a policy of your own choosing. No doubt, in due course, you will answer that question after mature deliberation of all phases of the problem. I am inclined to agree with the speaker that your land is too valuable for the growing of beef cattle, but ideal for the milch cow. For that reason I have chosen or predicated my summary along those lines, attempting, of course, to give full consideration to the importance of animal products in regard to the consuming public.

The improvement of livestock, as I see the big picture, can only be

accomplished by the application of the sound and broad principles of agronomy, nutriology, reproduction by scientific selection, particularly by the top cross, proper care and the avoidance of adverse sanitary environmental surroundings.

Unfortunately not sufficient stress is laid upon the fundamental character of the many and varied applications of veterinary science which are absolutely essential before other necessary attributes may be accomplished.

A healthy animal is axiomatic. All other endeavours are minimised or to no avail if health is sacrificed. Malignancy, no matter in what form or design, must be averted by the suppression and eradication of infectious diseases. A list of such diseases is well known by the profession, but instances require repetition of them in order that our point of contention may be known, at least, not misunderstood.

One shudders to think what would be the state of joint international efforts toward the end of the present conflict if the veterinary profession had not demonstrated its worth by the suppression and control of diseases of the lower animals. Unfortunately, few people not directly engaged in the livestock industry realise the tremendous ramifications of diseases and conditions which require the skill and scientific knowledge to keep animals healthy. It may be argued by our medical confrères that the same condition obtains in human medicine. Their contention is granted, but certainly not to the same point that education of the masses is the solution. Disease is averted in the human family by edicts, laws and education, but not so with the lower animal who merely learns to follow man's wishes by instinct, habit and repetition. The reasons why they do certain things in a certain way are questions for man to answer, not the lower animal. For that reason discerning individuals have advocated, and states have set up, National Schemes for the education of young men who follow our profession.

Veterinary education was founded in collegiate form with the declared intention to build up a profession of animal medicine comparable to that of the learned physician. The stated bases were (1) rural economics, and (2) urban transportation, with military strength as an additional motive. The time was the reign of Louis XV and the place was Lyons and Paris. Zootechnics and horseshoeing were therefore two of the main branches of the curricula. Conformation and dissection of animals, materia medica, pharmacy, chemistry and botany were the minor studies leading to proper understanding of the major ones. In the absence of precedent to serve as a guide, it was more than twenty years after the start before that much of the schedule was established. It is well known history that but for the fearless backing of the Secretary of State, Bretin, the founding of veterinary colleges in France would have been abandoned. The schools were brought under the shadow of the French Revolution and, although they suffered, they survived.

The cause of the French Revolution was hunger, and hunger alone. The founding of veterinary colleges was intended to relieve hunger, but the people then, as the people now, were not aware that the cause of hunger was diseases of farm animals, not the waste of aristocrats as the mob contended.

Tribulations of the Veterinary Faculties of Dresden (1774), of Hanover (1777), of Berlin and Munich (1790), were also severe. In London (1791), Canada (1862) and New York (1875) veterinary education was neither publicly sanctioned nor glorified and had to sink or swim without public support or popular encouragement.

In our country the want of adequate veterinary education came to the fore in the establishment of State institutions endowed in part by the Federal Government, under the provisions of the Morrell Law granting free education to residents of respective states to pursue a course of instruction along agricultural lines including veterinary science. Federal, State and Municipal control agencies are cognisant of our worth but combines whose chief function it is to distribute the products of the farm are unwilling to follow the edict of sanitary control and surroundings in a way to avert adverse tendencies in the consumer.

As for 1943, there is still much to be desired. Only a few of the more thoughtful economists stop to weigh the value of farm animal health in the march of man.

In spite of many obstacles and hardships the profession in the United States has accomplished almost impossible feats. (Hear, hear.)

Suppose we mention a few of the diseases of the lower animal, the control of which permits our joint governments to foster increased production, that several of the prominently mentioned fears may not take an adverse hold on the populace. It is natural to suppose that a want of a piece of food presupposes a want of a peace of mind.

Probably the best examples we have of the control of disease, whereby with impunity our government asks and receives increased production, is that indicated in splenetic fever (Texas fever) and hog cholera.

The history of the control and almost complete eradication of the former disease is bright in actual gain in opening up vast areas for the growing of livestock, particularly cattle. The aftermath as to the cause and vector " turned the medical profession around the corner " in control of other serious diseases, thus its original importance as a purely eradicatory procedure is almost lost. If this disease and others had not been subjected to our professional endeavours would such an increase in livestock and their products be possible ? Not likely.

In the case of hog cholera, while still a serious menace, the professional machinery is in order. If the apathy of all livestock owners were fully removed and they were to become consciously aware of the grave implications that follow, adequate, timely and scientific control measures could be readily applied.

Control of certain diseases of livestock has its importance also in the control of diseases of man. If, as some contend, although without scientific basis, we do remove the normal resistance from human beings and make such humans more prone to infection when exposure does occur, this should not lessen the importance of eradication of disease in animals. Human clinicians tell us that since the tuberculosis eradication in our country has reached its fullness, non-pulmonary tuberculosis is becoming a rarity. To such an extent is this true that glandular tuberculosis of clinical demonstrability is difficult to find for clinical material in our medical schools. This is true even in our own field with such diseases as generalised tuberculosis in cattle and the cutaneous or glandular form (farcy) of glanders. By control of bovine tuberculosis we have without any question almost eliminated the incidence of its counterpart in the human family.

Our tuberculosis eradication programme, with the entire country now an accredited area with an incidence less than 0·5 per cent., is a direct contribution to humanity. (Applause.) Not only has the cattle industry been made safer but human tuberculosis of the intestinal, osseous, lymphatic and cutaneous varieties are now, more or less, clinical oddities.

With the gradual decrease of tactical and dray animals in our Army the increase in importance of the inspection of food of animal origin has more than justified the continued employment by the War Department of scientifically trained men comprising the Veterinary Corps.

Our knowledge of disease and its comparative influence in all types of domestic animals has been the impetus behind placing the responsibility of the sequential steps, in the selection, preparation, handling, transportation and storage of all types of animal food products used by the Army, in our hands. (Hear, hear.)

The economic aspect of our inspection service is necessarily important but by far the most important phase is sanitation. Prevention of diseases or conditions which may and often do adversely affect the consumer, must be our ever-present watch-word. For many reasons that is why our endeavours are not of the spectacular type. One of our outstanding supply officers recently made a statement that he hoped it would not be necessary to condemn an ounce of food. In that statement we are all agreed, but to pass food for eventual human consumption, the ingestion of which may cause an ineffective soldier or group of ineffectives, cannot be condoned. Our real worth, therefore, aside from the economic aspect of our inspection, is to approve for issue only sound products thereby increasing morale and bodily stamina and preventing an abrupt ascendancy of the non-effective rate. It is a grave responsibility that is ours as it resolves itself to the point that it is not so much what a man eats as it is the soundness of the product that he consumes.

In procurement of perishable stores, except in unusual circumstances, we subscribe only to the acquisition of meat and meat food products from plants operating under control of the Bureau of Animal Industry, a branch of the Department of Agriculture. We accept their findings as to the soundness of the product. Sequential inspectional steps, after the product has been accepted by the Army for type, class and grade, are purely an effort to keep the product sound until issue to troops is effected. All animal products should be considered subject to violent changes of spoilage from chemical and bacteriological import, unless practical and scientific safeguards are employed and steadfastly observed.

Milk and its products are equally safeguarded with special emphasis on the source of supply. We believe that the intelligence of milk must start on the dairy farm with the sequential sanitary inspections necessary from point of production until it is actually placed in the hands of the consuming unit.

The hygienic condition of milk depends largely on the conditions existing at the source of supply. Unsanitary milk due to contamination at the source is thereafter correctible only in part, hence it is important that the milk shall come from healthy cows and that it shall be handled in a sanitary manner.

Pasteurisation has undoubted value in lowering numerical bacterial counts, but it is only a partial remedy for contamination at the source, therefore pasteurisation of the milk supply in no wise relieves the veterinary service from the necessity for inspection at the source.

Laboratory reports of the bacterial counts of milk samples may guide the veterinary officer in determining whether or not a particular dairy shall be recommended as an approved source of milk supply, and it is desirable that samples of milk be collected at the dairy and bacterial counts made to aid in determining sanitary conditions at that point. However, bacterial counts of milk samples taken after delivery to the station cannot be considered as meeting dairy inspection requirements.

If all factors known were applied to the entire picture of the milk industry, we would obviate the necessity of erecting so many large hospitals with their attendant staffs to care for the poor sick and the sick poor, under conditions which are largely preventible by suppression of the many diseases, both acute and chronic, the cause or causes of which may be inherent in the product or acquired by it as a vehicle for dissemination.

From your Press and editorial comment on the milk situation alone one soon realises that in the same way that you have reached the pinnacle of world prominence in other matters, you will soon find a solution to the milk problem. You have diseases of cattle which require eradication not only to perpetuate the family life of the cattle themselves, but the avoidance of diseases of the human family, particularly the young who are powerless to help themselves. It is not only diseases such as tuberculosis, brucellosis of all types, mastitis, that need our unified attention, but the further step in the handling of milk that pathogens and other contaminants may be avoided in assurance of a sound, nutritive and palatable article to the consumer.

Our stand on the acquisition and use of whole milk in this country for our troops is justified. You, at least your thinking individuals, I am led to believe, admire and appreciate our stand ; not an arbitrary stand, but one based on experience and recorded facts. (Applause.) Certainly the remarks of the author of the editorial in a recent issue of *The British Medical Journal* and your Government's Milk Policy need no comment. Clearly and succinctly are the facts of our stand substantiated.

Now who are the people whose foresight and long vision have permitted our control agencies to ask for and foster increased production on the farm ? They can ask for and receive an increase in farm animal products only in the same ratio that veterinary science has fostered and mastered control of insidious and death-dealing infectious diseases.

It is believed we should not, as professional men, permit average laymen to promulgate laws without the basic instincts and the barest knowledge of what diseases of animals, unless controlled, may impart, not only among the animals themselves but their counterparts in the human being.

With all due respect to the other great nations, the world looks to your country and mine as leaders in almost every phase of human endeavour. We cannot afford to let them down in matters under our control and on which we ourselves, if not actually identical in thought, should be unified. (Applause.)

Dr. Tj. Bakker (Holland) : This is the second time that I have had the privilege of being present at your annual meeting, representing my Government, and I can assure you that I enjoy these occasions.

What makes them so attractive is the friendly atmosphere in which opposing opinions try to find ways and means to co-ordinate the efforts of all to obtain the only justification of our professional existence :—

The Improvement of Livestock
in Health
in Performance

and I add with some hesitation " Beauty " as well. This is no mean task, as Professor Rae has made clear in his analysis of the problem and in his survey of the means which have already been taken to improve the general level of the livestock in Great Britain.

I am certain that the means described will have a considerable initial success—by eliminating the unprofitable animal ; very soon, however, a point will be reached where further progress is no longer assured : the same state of affairs that most pedigree breeders, and specially the breeders of dairy cattle, are facing now.

What about the future—which is not so far away either. And not only in this country, everywhere the same problems arise. The great advances in our knowledge of feeding livestock and the practical application of this together with improved management, the eradication of many deadly diseases and general improvement of health have had greater effect on the performance of our livestock than our breeding policy in the past. It is only in the last 30 years that real progress has been made in this field which our breeders have been able to stabilise more or less.

As already indicated, livestock improvement is a very complicated affair. We have to co-ordinate and balance the environmental factors of *climate, soil, health, nutrition and management* with the hereditary make-up of the animal to obtain the desired performance.

The breeding of all classes of livestock presents similar problems ; the improvement of dairy cattle, however, has some extra points of difficulty in so far as the economic value of the cow is determined by the function of a gland only present in one of the sexes, while the other sex has the greatest influence on the dairy cattle population as a whole.

I shall restrict myself therefore chiefly to the production of milk. We all agree that we aim at dairy herds

with the highest possible average yield ;
with a high efficiency in the conversion of feeding-stuffs to milk ;
made up of members possessing a strong constitution and able to reach an old age whilst maintaining their production.

In other words cows that give us a high economic return.

The question arises then : Are the standards of perfection accepted by the herd books the best guide to this goal ?

In my country, as well as in many others, authorities are of the opinion that in view of our recent acquired knowledge about the heredity of production capacity, constitution, longevity and food conversion, the standards of perfection as a whole are hardly compatible with our aims. We will have to get rid of many superstitions which guide us at present in our evaluation of dairy stock and revise drastically our scorecards—scorecards for dairy breeds on which we find points that have come down to us through the ages from Varro, Virgil and Columella, describing the virtues of the ancient draught oxen.

And what must we think as a profession of a show ring where dairy bulls are judged, forgive me the exaggeration, by their capacity in hiding their faults under layers of fat ?

It is a great tribute to the breeders of dairy cattle to have achieved, under these handicaps, the outstanding results we all know.

Without any doubt the methods and practices of the past have accomplished a great deal, yet many outstanding breeders agree that they have brought us as far as they can. The most we can expect now is to hold the gains and that will not satisfy us for long.

The 1936 Year Book of Agriculture of the United States formulated four main points which retard progress and which are still valid to-day.

1. *The domination of standards that are incomplete and in some cases inaccurate.*
2. *Lack of real yardsticks to supplement or revise existing standards.*
3. *Large gaps in the knowledge of animal genetics.*
4. *Certain factors that stand in the way of experimenting, including the expense of new experiments.*

What can be done to improve this situation without upsetting all our achievements ?

Almost every breed has an official description of its ideal which is not primarily based on biological values applicable to a breed improvement programme. These aesthetic show points are not wrong in themselves, if our object of breeding is to please the eye.

If we wish to breed an animal of economic value, for milk production, butterfat, meat, bacon, eggs, we multiply the goals we aim at by these fancy points, exaggerate their importance as they are directly apparent to everybody, so that really fundamental considerations get insufficient attention.

Every general breeding policy should therefore be concentrated chiefly on the hereditary aspects of *Health, Constitution, Longevity* and *Production.*

Our successful breeders, those accused of possessing the true breeder's eye, do not work in the dark. They possess an intimate knowledge of their own breeding animals, they have keen powers of observation. They acquire a wealth of detailed information concerning a small group of animals, which is sometimes recorded for the use of their successors, more often is lost when they die. All this information is only used to a limited extent by the breeder himself and exchange of real information between breeders and utilisation on a wider scale does not generally take place.

In my country milk recording started in 1895 and in the records of the milk recording society a wealth of information has accumulated which is only partly utilised. A systematic statistical survey of this material with the object of assisting a rational breeding policy for production is only undertaken on a very small scale.

The same applies to the records of herdbooks and breeding societies. Their material and experience is only known and utilised in a restricted circle; very often much valuable information enters the offices and there goes to earth never to appear again.

To improve the economic level of the whole livestock population we need an organised and centralised co-operation between the breeder and keeper of livestock, pedigree as well as commercial, all recording and breeding societies, herdbooks and the scientist, with the object of supplying the individual breeder with the information he needs and cannot acquire individually.

And a greater exchange of information between breeders of different breeds and types of animals is needed as well. The experience gained with poultry, rabbits or pigs can be valuable for the cattle breeder and the other way round also.

As an example, I can give the achievements of the organisation of the poultry industry in Holland. Between 1933 and 1938 the number of birds in production was reduced by 3,650,000, while the number of eggs produced increased by 250,000,000. The general health of the flocks had improved considerably while the mortality of all ages showed a distinct decline.

In hard cash this meant a reduction of the feeding cost per year alone by 10,000,000 guilders, not to mention the other advantages.

The effect of the selective pig fattening plants on the general level of the bacon pigs received at the bacon factories also is illustrated. From 1930 up to 1940 the number of grade A pigs received increased from 52 *to* 97 *per cent.* Length of carcase increased from 75·6 *cm. to* 80·4 *cm.*; percentage of ham from 13·39 *to* 13·75, percentage of meat from 46 *to* 53.

At the same time the fertility of the breeding sows was taken into consideration as well as the ratio of pigs born to pigs weaned.

These remarkable results were rendered possible by concentrating entirely on the economic values, by being able to compare the offspring of the breeding stock under as near as possible identical conditions which made an almost exact estimation of breeding value possible. The high rate of reproduction of these animals did the rest.

For our dairy cattle we need in the first place records that are accurate and can be compared irrespective of district, farm or year. For this purpose corrections have to be made as on the lines suggested by Sanders in this country and Bonsma in Holland. I cannot enter into details but an enumeration of the factors involved will make it clear that this is work for specially trained personnel. Corrections are needed for: *Age*; *Date of calving*; *Length of previous dry period*; *Length of period between calving and subsequent conception*; *General condition and health of animal*; *Climatic variations between years*; *Feeding*; *General management.*

Take, *e.g.*, the province of Friesland, where 60 per cent. of all cows are milk recorded, over a period of 17 years, taking the most normal of years at 100. We find that the milk yield varies from 88 *to* 104 *per cent.*, which illustrates adequately the influence of climatic, hygienic, economic and pathological factors.

A very disturbing factor on the continent is the periodic occurrence of foot-and-mouth disease, which plays havoc with our records, as not only do the milk yields drop, but the movements of our recorders are restricted as well.

To assess the influence of management and feeding is an extremely difficult task, and will probably never be entirely reliable. Many obstacles can, however, be overcome by training the milk recorder, who visits the farm regularly to assist the farmers with their feeding problems and to record his observations together with the milk records. This has already been done for a considerable time with great success in Denmark, and was started in Holland before the war on more than an experimental scale.

The only reliable index in the value of a bull is, as Professor Rae has already mentioned, to determine his breeding value. Many show-ring champions have failed as sires, particularly from a production point of view, and through their extensive use have been responsible for a marked decline in the level of production of many herds.

Analysing the breeding value of Freisian Bulls in South Africa, Bonsma draws attention to another disturbing fact. He has obtained evidence to show that a bull may breed consistently well when mated to the progeny of, say, Bull A, whilst with the progeny of Bull B the results may prove most disappointing. This makes it even more urgent that records are kept of all matings of pedigree bulls and that all female descendants which reach the milking stage are recorded. Only then can we obtain a clear picture of the breeding possibilities in and between bloodlines and families in a given breed of dairy cattle.

I am aware that I have only been able to indicate a few scattered points of the whole field of survey that is necessary, if we are going to organise the improvement of dairy cattle upon a footing which is going to stand the test of time.

A special task, that alone the veterinary profession can perform, is to eliminate all disturbing factors due to ill-health, acute or chronic, within our power and where they occur see that they are recorded for future reference.

And let us be on the look-out for lethal and sub-lethal factors, and report these to the herdbooks as soon as suspected.

The damage done in Friesland amongst the pedigree stock due to the factor for smooth tongue is considerable and can all be traced back to one bull, which was a famous champion of the show-ring, although possessing this defect. The case of hypoplasia of the left ovary amongst one of the Swedish dairy herds is another famous example.

For bulls that are going to be used for artificial insemination this is of special importance, as their influence is many times greater than that of the average stock-bull. A few daughters of these bulls should be bred back to their sires, as this is one of the quickest and surest ways to determine inherent defects in a sire's germinal make-up which may not be apparent in the first generation.

In short, what we ought to have is a State assisted central organisation, solely occupied with the compilation of records, more records and ever more records, as it is the great number and the repetition that gives them their value. With officers who make the information available and understandable for the individual breeder, herdbooks, recording societies and such like, should open their records and assist whole-heartedly in this and should not be afraid to record facts, which might be detrimental from a short-sighted point of view but of immense value for the country as a whole.

The effect of this may not be apparent at once, but after 20 years the breeders will appreciate this work and be grateful for the pen-pusher of to-day, as we are now for the records between 1900 and 1920, however incomplete they may be for our purpose.

When sufficient and correct information is supplied to the intelligent breeder, we can rest assured that he will develop a sound breeding programme, achieve an unchecked and steady progress and lasting improvement of all livestock. (Applause.)

Mr. S. L. Hignett (Wellcome Physiological Research Laboratories), who was the third opener of the discussion, said: After the galaxy of talent which has been on show this morning it is with diffidence that I put in an appearance. In any case I am putting my trust in reflected glory rather than comparison.

Professor Rae rightly draws attention to the fact that the Government has not yet stated its post-war policy for agriculture. We still do not know whether this policy, as far as livestock is concerned, will be based on the importation of finished animal products for human consumption or the bringing to these shores of animal feeding-stuffs for conversion, along with home produced fodder, into human food. It seems certain that importation must recommence with the establishment of peace; on which side will the emphasis lie?

During the war years we have seen a remarkable "cashing-in" on the latent fertility of our soil. It must be replaced and, while one appreciates what can be done by modern methods of cultivation, is it too much to suggest that the primary need will be a considerable extension of our livestock industry?

In this consumer country most of our agricultural products have to compete with those of the great producing lands overseas. In these circumstances *our* products must be put on *our* markets as economically as possible—with the least possible wastage. Some level of State assistance—by subsidy or quota or other direct and indirect means—may well be necessary to create and keep a prosperous agriculture. The consumer is only likely to agree to the direct or indirect increase in the cost of living which will result from such a policy if he is satisfied that the industry is efficiently run. We, therefore foresee the continued control of agriculture by bodies developed from the War Agricultural Executive Committees whose work in the present emergency we all must applaud. These Committees are the instruments of Government policy. They and the various Divisions of the Ministry must, in my view, continue to exercise a considerable degree of control. When the emphasis moves from the arable to the livestock side, farmers and veterinary surgeons alike may well have to accept a degree of control and direction greater than that we have hitherto experienced in the livestock industry. It may well be demanded by the ratepayers of the country as their justifiable price for the creation of conditions which will keep agriculture prosperous and avoid the slipping back into the depression of the pre-war era. In some of the discussions we have heard, one could not but wonder if agriculture was looked on by some as a social service or as a great industry.

To refer to this country as the "stud farm of the world" is surely incorrect. The stud farm of the world is *in this country* but it is composed of the comparatively few farms which produce livestock of which we can be justifiably proud. Professor Rae quite rightly asks if we "have the same feeling of pride at the ordinary sale of store cattle, or driving through the country lanes, or looking out of the window of a railway coach?" I think most of us must answer that if the animals we see then are part of the stud farm of the world, Heaven help the world!

There is more than an element of uncertainty as to what exactly is meant by the term "improvement of livestock." In the case of the dairy cow the term conjures the picture of increased milk yield. In the cases of beef cattle, horses, sheep, pigs and poultry, other criteria are chosen. Now, whilst increased milk production is an aim in the improvement of dairy cattle and is generally considered of primary importance, there are those, judging by articles which have appeared of late in the veterinary press, who consider that breeding for further increase of milk would be retrogressive. Thus, in considering one branch of livestock we find two groups of people whom we must class as "informed" setting up diagonally opposite objectives.

Cattle.—For some years those interested in dairy cattle have striven for animals which will give 2,000 gallons of milk per lactation,

Unfortunately much of the breeding has been carried on without due attention to repercussions which are likely to occur. It is correct to say that Nature is carefully balanced and if the balance is upset in one direction the effect will be felt in another. Cows have been bred for milk production without consideration to weaknesses liable to creep in when attention has been solely directed to improvement along one narrow path. What is the true value of the cow which yields 2,000 gallons but does not last beyond her third lactation? Many owners of good commercial herds have reached the conclusion that the cow giving 800 or 900 gallons of milk, producing a calf practically every year and able to maintain its place in the herd for about eight years, is by far preferable to the record breaking milking machine. In the case of dairy cattle, yield and butterfat have been sought with complete disregard to the general health and stamina of the animal. In passing, let us not overlook the fact that phenomenal yields were occasionally recorded, one hundred, even two hundred years ago.

There will always be two opinions as to the place of the single purpose as against the dual purpose cow. The drawback to the pure milking breed is the difficulty of getting a reasonable price for the carcase when the animal's useful milking life is terminated for any reason. Many of us realise how much easier it is to eradicate disease from a herd of Shorthorns than one of Guernseys because the owner suffers far less financial loss when animals have to be culled. As an example of a real dual purpose animal, may I recommend the Red Poll?

Members of the veterinary profession must take an increasing interest in the very real problems facing the breeders of dairy cattle. We must be in a position to give advice for the improvement of animals, maintaining the correct balance between yield, butterfat, conformation, stamina, etc.

During the last few years we have heard a great deal about proven sires. It was with pleasure that I heard Professor Rae say that the terms "proven sire" and "progeny tested" must be used with great care and only when they are fully justified. To get to the root of the problem we must not only know how much milk the bull's daughters yield during their first lactation but for how many lactations the females of this particular strain are likely to serve a useful purpose in the average commercial herd.

As a keen supporter of milk recording I am, at the same time, conscious of the fact that there are those who believe we must improve the existing systems. The bald statement that a particular cow gave so many hundred gallons of milk during a lactation may mean relatively little. The seeker after truth would wish to know the conditions under which that cow had been kept, the time of the year at which she calved, etc. Simple milk recording figures are probably far less important than some enthusiasts would have us believe. To take a simple example, two cows, "A" and "B," produced calves in the same herd at about the same date. "A" was milked thrice daily during her previous lactation and as a result of this and of special feeding gave a higher yield than "B" which was only milked twice daily. "A's" bull calf may be much sought after because of its dam's higher yield, whereas "B's" may be the more desirable as a stock bull.

I was very pleased that Professor Rae referred to a register of bull breeding herds. I think such a register should not be concerned with herds but with individuals. Far too frequently the tendency is, in those herds with a big reputation, to keep all the male calves for stock because the owner knows that he will get an exaggerated price for second- or even third-class males sold for breeding. It is common to see bulls, even at the best sales, which would never have entered if they had to depend upon their own quality and not on the reputation of the herd from which they came. Hence my plea for a register of bull breeding *individuals*.

This brings me to the vexed question of the Licensing of Bulls Act as applied to Great Britain. None would be prepared to say that this scheme has been an unqualified success in this country. When visiting farms, it is difficult to understand how certain bulls were granted a licence. On the other hand one is occasionally at a loss to understand why a certain bull has been rejected. Little or no attention is given to the bull's ancestors. If cattle breeding in this country is to improve, as it should improve, the Licensing of Bulls Act must be reconsidered and amended with particular attention to the tightening up of the conditions which are required of a bull before he is licensed. One suggestion is that the bull of nine or ten months should not be licensed for life but should come up for reconsideration, say, every year. At some of the later inspections consideration could be given to the bull's progeny. The authorities in this country would do well to contemplate what has been done on the other side of the Irish Sea. The excellent results obtained can hardly be due to the fact that a scheme has been operating longer on that side of the water. Certain it is that in the case of Ireland—both North and South—the Bull Licensing Scheme has yielded results of which the originators and those who have controlled it can be justly proud.

Here, it is possible to license a cross-bred bull. Surely a licence should only be granted to a pure-bred animal. Whilst there is much to be said for a first cross, cross breeding in many herds is being carried on indiscriminately. One hears of the farmer who has used successively Shorthorn, Friesian and Ayrshire bulls. Would it be possible to license a bull to a particular herd?

I should like to point out that visitors here from north of the Tweed will be disappointed that Professor Rae singled out the Shorthorn and British Friesian Cattle Societies as having schemes which make it possible for keen farmers, without the purchase of pedigree stock except bulls, eventually to get all their animals up to pedigree status and entered in the respective societies' herdbooks. The Ayrshire people, I am sure, are proud to be able to claim all that.

I am very interested in what has been said about attested areas in rearing districts. The man on the heavily rented lowland dairy farm needs replacements of healthy cattle. They can be supplied by the farms on the marginal and low hill lands, but the dairy farmer wants something more than *healthy* cattle. He requires cattle of such a grade that in his herd they will give a satisfactory milk yield. Thus it is essential not only to produce healthy stock in the rearing areas but also to produce stock of such quality that they are attractive to the lowland farmers.

Much has been written and said about artificial insemination. The work of the two centres now being run at Cambridge and Reading is being watched with keen interest by both veterinarians and agriculturalists. As far as present knowledge goes it is certain that the greatest advantage of an artificial insemination scheme in this country would be the introduction of high-class blood into the herd of the small farmer who in the past, for financial reasons alone, has been able to keep only a second-rate bull or has depended on the third-rate bull of his neighbour. I consider that this advantage to the small farmer far exceeds any of the various other claims for artificial mating, even its value in the control of venereal diseases of cattle.

Horses.—Most veterinarians will agree that the Licensing of Stallions Act has done far more for the improvement of horses than has the Bull Licensing Scheme for cattle. In the case of the horse, quality is bound to benefit from the fact that the stallion is licensed for only twelve months. When dealing with bloodstock I think most of us would wish more attention paid to the breeding of stayers rather than sprinters. The real stayer is a hero with everybody from the expert to the uninitiated. Yet in the bloodstock world it would appear that all too little attention is given to this quality—we have only to consider the very small number of lines of bloodstock which can claim to possess stamina.

Sheep.—We all await with interest the report of the Hill Sheep Committee. It was essential that such a committee should investigate ways and means of furthering the hill sheep industry because the hill sheep is the foundation for much of our lowland mutton production. To discuss at length the improvement of sheep would, I feel, be out of place until such time as the report of this committee is published. It would be interesting to speculate how the problem of maintaining hardiness, yet producing a sheep which meets modern market demands, is to be solved.

We would wish to welcome the recommendations of the committee which led to the introduction of the Hill Rams Control Order of 1943. Such a measure was long overdue and *if properly administered* should do much to improve the quality of sheep stock on the hill farms.

From what Professor Rae has said one would gather that the hill sheep subsidy was designed to bring about improvement of hill sheep flocks. As far as I am aware this was not the case. The hill sheep subsidy had as its object the making good of heavy financial loss due to severe winter conditions and adverse control effects which seemed likely to cause wholesale dispersal of flocks and destruction of the industry.

It has very generally been accepted that folded sheep are essential for arable farming on certain types of light land. Recent work has suggested that suitable cultivations may replace sheep. Methods not involving the use of folded sheep have, however, not been employed sufficiently long to enable one to say that they can be continuously employed.

Pigs.—The most rapid advances in pig breeding will be made under a system of centralised grading and centralised slaughtering. With such a system in operation the farmer is paid a higher price for producing the desired carcase. Consequently, he soon appreciates what is required of him and is the more likely to adopt systems of breeding and management which will effect the desired improvement.

There is already a demand for a Boar Licensing Scheme. Before any such scheme can be put in operation very careful consideration will have to be given to the objectives of the pig industry after the war. If most of the bacon is to be imported from Canada and elsewhere, then pig breeders in this country must concentrate on the production of pork. If, on the other hand, there are to be developments along lines similar to those sponsored by the Pig Marketing Board then every precaution must be taken to see that we produce pigs whose bacon can compete with that of overseas friends.

Poultry.—As in the case of dairy cattle so in the poultry world, everything has been sacrificed for single-line production. Hence the situation in which the poultry industry found itself some ten years ago. Now, with the poultry population depleted to its lowest level, we have a Heaven-sent opportunity to prevent a repetition of the previous debacle. Under war-time conditions extra rations are available for approved breeding stock and after the war it is essential that control measures be adopted to prevent wholesale production of weak non-resistant strains of birds—even if it necessitates a lapse of some years before the poultry population reaches a satisfactory level. Agriculturalists as a whole, and poultry breeders in particular, should insist that only those strains whose stamina and resistance is above reproach be used for restoring our sadly depleted poultry stocks. This is a field in which the Animal Health Division can render invaluable service to the country. Because of the comparatively low value of birds there is far less excuse for the retention for breeding purposes of unsuitable poultry than would be the case with cattle or horses.

Livestock improvement depends not only upon genetics but also upon farm management. Professor Rae has rightly drawn attention to the use of temporary leys. It has already been stated that Nature is carefully balanced and, whilst I do not wish in any way to belittle the importance of temporary leys, I think we shall do them an injustice if we regard them as a panacea for the control of all animal disease liable to be acquired from pasture. May I point out that there are certain diseases of this group which are just as likely to occur in animals grazing reseeded pastures as in animals on permanent grassland. I need only mention, as examples, husk and pulpy kidney disease. Again, certain mineral deficiencies are more likely to occur on reseeded than on permanent pasture, due to the lime applied at the time of reseeding locking up in the soil such trace elements as manganese and copper.

Agriculturalists in this country profess to be keen stockmen but far too many are interested in immediate returns and in the immediate products of their stock, for example, milk and eggs, than in the future of the herd and flocks. Such an attitude can be defended in war-time but it had been adopted before the war. The owners of flying herds are quite disinterested in the future of our cattle. Is it too much to suggest that to fight exploitation of stock there must be some form of control? For purely practical reasons flying herds will always be with us. For purposes of milk production breeding, if only on a limited scale, must be undertaken in these herds. It would seem to be eminently desirable that there be some control of the progeny.

We of the veterinary profession must decide what part we are going to play in the improvement of livestock in this country, now and during the post-war era. That we can serve a very usetul purpose in the consideration of the problem will be disputed by none. Breeding has come within the purview of agriculturalists and geneticists and in the past the veterinarian has all too frequently been ignored. That he has not been engaged more often was in too many cases due entirely to his own lack of interest and initiative. We must not presume to be the only people qualified to give advice on the breeding of livestock but we must see to it that we are in a position to give advice when and where it is required, particularly on the question of producing disease-free or disease-resistant stock. (Applause.)

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General Discussion

Mr. H. W. Steele-Bodger desired to record his appreciation of all that had been said by the openers of the discussion. He would confine his remarks to three or four items. In Professor Rae's paper he had emphasised the value of milk recording, though the emphasis had been tempered by Mr. Hignett. In herds which were regularly milk-recorded—night and morning—there was often a slight falling off of the milk yield at the time of the oestral period, and that slight falling off might be the only outward and visible sign of a cow being in oestrous. During the winter period it was essential that those signs should be looked for, and the cow in question could be distinguished as a result of accurate milk recording.

With regard to bull licensing, much had been said about the value of a bull licence, and Mr. Hignett had stated that there was a great diversity of opinion amongst those whose duty it was to license bulls. He believed he was right in saying that in Staffordshire the bull licensing officer would not license cross-bred bulls. This was a lead which might well be emulated in other counties.

But he wished to take this opportunity to emphasise the importance to the veterinary profession of serious consideration of the recent White Paper on milk. In that paper the Minister of Agriculture outlined his policy. Within that policy it was the intention that in the case of accredited herds the milk from which was heat treated, inspection should take place once a year instead of quarterly. To his mind that was a retrograde step and not conducive to the improvement of livestock. The official visiting of the farm by the Ministry's inspector placed him in a position to tender advice to the farmer on questions of livestock improvement. The reason given by the Ministry for this proposed reduction was that there was an insufficient number of veterinary officers to carry out the suggested inspections. This assertion he strongly disputed, and he was sure that his opinion would be shared by the vast majority of L.V.I.s. Members would do well to consider the repercussions of the proposals in the White Paper upon the Association's conception of livestock improvement.

Mr. Hignett had stressed rightly the maintenance of a balance in dairy herds. In his view that could not be over emphasised. Farmers would often complain that it was their best milking cows which had reacted to the tuberculin test or had gone down with some disease. It was logical to expect these outstanding cows so to go down. It was not the fault of the animal but of the individual who had forced the animal beyond the economic limit. Again, they could do a good deal in the way of advising farmers on that score.

Professor Rae had stressed the importance of conformation of animals. It was part of their duty to advise farmers on that, in dairy herds as well as in beef herds. He was not inclined to agree with the speaker that this was easier in the beef herd than in the dairy herd. They could by examining the texture of the skin, the fineness of the horn, the slimness of the tail, the width and openness of the ear, and the shape and carriage of the udder form a very good opinion as to the quality of the animal. He would even suggest that in the examination of heifer calves they could base a sound opinion on these factors particularly, in the case of the dairy heifer calf, the nicely opened ear and the position of the teats.

On the question of artificial insemination Professor Rae had stressed two important factors; a third was the possible control of venereal diseases. The factor of the control of disease must be considered.

Finally, he would like to thank Professor Rae for his compliment to the survey scheme. The number of herds which one practitioner could undertake within this scheme was governed, not only by the incidence of disease, but by the accuracy or otherwise of the records kept by the stockowner.

Professor W. C. Miller said he was sure they would agree that Professor Rae's paper was useful and instructive. Professor Rae played a considerable part in veterinary education and had very kindly placed the facilities of Reading University Farm at Sonning at the disposal of the College for teaching purposes. He did not wish to air his own views at the moment. Many very controversial points had been raised and there was no need to repeat them. But he desired to ask one question of Professor Rae: Could he indicate how near was this country to saturation point regarding its animal population? Assuming that pre-war conditions would in some measure return and that imported feeding-stuffs would be available in the future, what percentage of stock were we carrying in comparison with what we could carry? If an answer could be given to that question it would help to indicate how much greater livestock production was needed in the future.

A second point had been touched upon by Dr. Bakker. How much of the characterisation of the dairy cow, to take a concrete example, was due, in very general terms, to (*a*) its inherited characteristics and how much to (*b*) its feeding, management, and so on? In other words, how much was genetic and how much environmental, assuming, of course, that freedom from disease and other interfering factors were equal?

It was a difficult question but it was worth asking in order to get into some sort of proper perspective the possible conflict of opinion which might easily arise between the breeder who thought in terms of inheritance only and the breeder who thought in terms of feeding and management only. One had heard statements such as, "I will let you breed him if you will let me feed him." Some sort of answer in general terms was needed, if it could be given. Though Britain had produced some of the finest stock, we in this country had hitherto had a very serious lacuna in our scientific knowledge of inherited characteristics in all livestock. The Americans had been ahead of us in this respect; they thought a country which neglected genetics was guilty of moral lassitude, as they had heard from Colonel Curley.

There was one other point which was worth stressing with regard to artificial insemination. Thinking of it dispassionately, it was easy to talk about improvements following the use of a good bull employed for artificial insemination of cows of poor quality in small herds which belonged to an owner who was not able to keep his own bull or who had kept a bad bull. But that was not the whole story. In addition to an artificial insemination scheme there must be great improvement in the method of rearing the calves and the housing, feeding and general management and control of the young stock if the best results were to be obtained.

Otherwise it would be so much wastage to use the semen from a highly bred bull on a farm where methods of management and the environmental factors were such that they nullified or partly nullified the benefit which otherwise might result.

He wished to emphasise again the necessity for a greater degree of team work. No one section of the scientific community could claim to have all the necessary knowledge. Hitherto there had been too much working in watertight compartments. Better co-operation between agriculturalists, veterinarians and others was needed in the interests of all.

Sir Arthur Olver said that he had come to that meeting to learn and he had learned a great deal. He wished to congratulate Dr. Rae and the other openers on their papers. During his service in India as Animal Husbandry Expert records had been available to him concerning large numbers of animals all over the country and the data from these records might be of use in this discussion. One of the points which was most striking was the importance of having a definite policy and breeding to a definite type. There were two different aspects of cattle breeding problems in India: whether to aim at a purely working animal, the mainstay of agriculture and transportation, a purely dairy animal or a dual purpose work and milk type. The point of view he took was that a high standard could never be reached in either capacity unless a definite policy were laid down and pursued without deviation. What the breeder in India did not understand was that so-called dual-purpose breeding resembled a see-saw. As one end was pushed up the other end came down with equal sharpness and no reliance could be placed on the progeny if sires of different types were used alternatively.

The desirability of importing European cattle into India, for cross-breeding, was in fact a very serious question, and although the difference between the types here was not as marked as that between Zebu and European cattle, the same principle applied. In India the danger was that while in the military dairy farms excellent results were obtained from well regulated and controlled cross-breeding, by expert breeders who kept milk and other records up to a high standard, the principles underlying such breeding were not understood by the vast majority of Indian breeders. The military dairy farms, moreover, bred to a definite policy to produce the highest milk yield compatible with stamina and were trying to establish a breed with a certain percentage of European blood which would stand up to the Indian climate. In the north of India when he left they were in fact trying to produce a breed of pure Friesians capable of doing this. From cross-breeding with European cattle the results in the first generation were promising, but particularly in South India, in the tropical zone, subsequent results were disappointing: and everywhere there was great danger that half-bred males from such herds would get into the hands of Indian breeders whose one idea was that if they secured a drop of European blood they would thereby improve their stock. He had seen appalling damage done to fine indigenous herds of cattle as a result of such cross-breeding, and he was quite sure that the same principle applied here. To obtain lasting improvement a definite policy must be framed and rigidly pursued.

Another most important factor in the improvement of cattle was the feeding and management. He would not suggest that certain figures which he might give were applicable in a country such as this, where the cattle had been carefully bred for many generations and where the conditions of management did not vary to the same extent as in India, but from the records of large numbers of cows bought in the market by the military dairy farms, presumably the best obtainable, for they paid high prices, it appeared that the yield of these same cows after a sufficient time on improved feeding and management increased roughly by 60 per cent., while the heifers from these cows, although the best bulls obtainable had been used, showed on the average an increase over their dam's yield of no more than about 13 per cent. That was no doubt due to the fact that previously the management was far from satisfactory but it did show very clearly that feeding and management are most important factors in livestock improvement.

Dr. N. S. Barron said the policy of keeping a dual purpose cow seemed to him to be a short-sighted one. The difference in price between an average beef animal and the value of the extra milk which would be given by a good dairy cow made a strong argument in favour of the single purpose animal.

One speaker had referred to the danger of going against nature and in this connection mentioned the odd cases in which cows gave up to 2,000 gallons of milk per year. The speaker agreed that nature could not be pushed too far but it must be remembered that even the dairy cow giving 500 gallons was an abnormality. However by scientific feeding and breeding it was quite possible to maintain healthy and vigorous herds without upsetting the balance of nature and he thought that the 800 gallon cow was a reasonable objective although one still far from being attained. Members of the veterinary profession ought to have their own policy so that when discussing these matters with their clients they could express views which had a scientific basis and were possible of attainment.

He had been glad to hear raised the question of the points of the dairy cow. It seemed to him that one could not take a very definite line. After all, the points of a dairy cow did give some indication whether she was a good milker or not, but they were of no great value unless the milk records of the individual were known as well. Unfortunately many breeders seemed to have gone off the rails and the judges had encouraged emphasis on sentimental points having no relation to milking capacity. It was staggering to go on to a farm and see a most extraordinary Heath-Robinson contraption for training the horns of cows in a certain way by having a special attachment applied to them with weights so as to induce a particular shape. All that was very retrogressive, it did not lead them anywhere.

Mr. Mitchell said that it seemed to him that a great deal of the question of the production and breeding of dairy cows was bound up with finance. Money could do a great deal. Professor Miller had stressed the point that it was a great wastage to use the semen from a highly bred bull on a farm where the influence of environmental factors could nullify the benefit which would otherwise result. In his part of the country a considerable percentage of the poor grade cows were the result of the poverty of those who brought up the calves. If the calves were brought up by the small dalesman they often seemed to have to fend for themselves, never getting a proper start in life. On the other hand, even from comparatively inferior sires and dams, a youngster could do well if it was fed decently and well treated during the first year of life. Another point was that many of the animals which were reared in those conditions belonged to owners who lived precariously, and, in the endeavour to find cash wherewith to live, mated and sold their heifers at an early age, bringing into market a stunted little thing from which nothing could be expected.

Mr. G. N. Gould said that Professor Rae had made a few complimentary remarks concerning the survey scheme and had referred to its limited application. As one who had worked it in practice to a fairly large extent, he found that a most serious limitation to the scheme was the failure of the farmers to maintain adequate breeding records or to make the regular returns necessary to ensure the efficient working of the scheme. Another point was the failure of farmers generally to identify their animals. Identification of animals on the farm was an absolute necessity if any concerted attack on the diseases was to be made, more particularly when attempting to do anything on the scale of the survey scheme. Where there was a heavy incidence of reactors to the tuberculin test, in his experience the only solution had been to concentrate on the young stock which was strictly segregated and built into replacement herds.

Professor Rae had also mentioned attested herds. There were areas in this country which might well be turned into rearing areas, and steps should be taken at an early date to bring that about. He had in mind in particular such an area as the New Forest. There it was possible to build up replacements for attested herds from the Forest stock with a minimum loss from reactors. There were doubtless other areas where young stock grown under similar conditions would give a similar low percentage of reactors and also have equal milking propensity. The foresters had been pressing for the opening of an artificial insemination centre for about two years, with a view to grading up their stock, with very little official encouragement.

Professor Rae had made a great point of the self-contained herd. For a long time his views concerning this matter had been at variance with many of the pronouncements made concerning it. A considerable amount of tuberculosis eradication work in individual herds had been done in his own area and it was found that a self-contained herd had no merit at all unless there was a disease eradication or control policy in force. Experience in testing herds showed that they often had the highest incidence of reactors in closely self-contained herds at initial tests. He knew of one herd in which no new purchases had been made for ten years, but the percentage of reactors in apparently good looking stock was over 90. He found a far lower incidence of reactors in flying herds replenished by the purchase of good class first calf heifers.

A point that needed to be made clear, as one discovered from the correspondence columns of both the farming and veterinary journals, concerned grading up. The animals we needed to grade up were the 300 to 400 gallon cows, the former of which were far too numerous: the aim was to grade these 300-gallon cows up to 400, and 400 up to 500 and so on to ensure an economic level of production. The grading up policy did not mean making every animal a 1,000-gallon cow, with all the possibilities and indeed the probabilities of disease troubles likely to result. The influence of the bull on the milking propensity of its progeny could not be over-emphasised.

Dr. J. T. Edwards congratulated the President on staging that discussion at the present time and on the selection of an admirable quartette of opening speakers, who had presented a symposium throughout which he (Dr. Edwards) seemed to discern a theme, which was that *in striving for increased production they should never relax their efforts to retain, in the animals so bred, the ability to live.*

The situation must not be overlooked that it was only within the last 200 years or less in Western Europe, mainly since the great cattle scourges like cattle plague had been brought under control, that intensive livestock improvement had become lucrative or even possible and the breeding capacities, or "genetic potentials," of the species consequently strained to achieve certain ends. During that very short evolutionary period there had been developments in two directions, both fraught with danger. One of these was the multiplication, as had been said, of scrub stock and the other was the straining of the bovine species to "over produce," *i.e.*, beyond what was essential for the perpetuation of the species itself, in certain directions, particularly in milk. The recent experiences in the poultry industry gave them serious warning of the dangers inherent in straining the reproductive system of a species whilst meanwhile disregarding the viability of the organism.

The records of the German federation of veterinary experts on the disorders of breeding stock during the last 20 years or so were very impressive and instructive. In particular, they pointed out very clearly that in bovine infertility the various organic defects which could be diagnosed frequently, but by no means constantly, differed greatly in their proportionate distribution in the several districts from which data were received; they varied in no small measure according to the length of experience and caprice of the diagnostician. Except where specific infection, such as tuberculosis, could be definitely incriminated, they were of such diversity and irregularity that the conclusion was forced upon the recorders that temporary infertility and sterility in the bovine female was in the nature of a "complex." This complex was, it would seem, engendered by a disturbance in the harmony of several internal mechanisms, particularly in the co-ordination of the secretory activities of the endocrine glands, of the "tone" of the autonomic nervous system (which is dependent, among other things, upon a delicately adjusted balance of certain mineral elements in the blood), and the involuntary muscle tissue. A cow in sustained anoestrus would thus remain in a state of "sympatheticotonia," whilst failure to hold the service through recurrent oestrum would denote a dominant "vagotonia." The endometritis commonly diagnosed by many observers would be primarily often attributable, it was therefore said, to the faulty involution of the uterus which was part of the symptom-complex in the former condition. "Pyometra" would again be the sequel of failure of the embryo to develop or become implanted on the uterine mucosa. The "sterility complex" as thus explained, would appear to be merely a portion of a much larger "complex," affecting besides the reproductive tract, the neuro-motor system, as in milk fever, and probably mammary activity.

Disturbances of this order would be attributable to, either or both, genetic and environmental influences and among the latter one need only mention faulty nutrition, which in the case of cows at pasture relates ultimately to the composition of the soil, faulty maintenance, comprising in particular such defects as absence of sunlight, abnormal "breeding stresses," and excessive "drain" on the constitution.

He (the speaker) hoped to be forgiven for giving this much in the way of what was new to be learned about the causes of certain constitutional deteriorations that had only become prominent in the veterinary literature well within the last half century, since intensive breeding for high milk production and highly artificial systems of maintenance had come to the forefront; a perusal of the modes of treatment exploited to control the disorders, often imaginary, during that period did not make very edifying reading. He thought that as a profession they needed to be very circumspect at the present time how they viewed this question and its implications. As had been said by distinguished workers on the subject (e.g. Cuillé and Chelle, 1932; Götze, 1938) in no other condition was the easy fallacy *Post hoc, ergo propter hoc* more likely to be accepted by the veterinary surgeon who saw return to oestrum follow any given line of treatment which temporarily, and lucratively, took his fancy. Return to normal breeding might occur if the "orchestra" was tuned up in any of its component parts, or, even if left alone, the indications in the literature being that the intervention should be as little drastic as was just necessary to restart rhythm. [As the late Sir John M'Fadyean had said (1925), dealing with the causes of this problem; "Patience is a virtue, sometimes better rewarded than perseverance," dismissing, as he said, all that he intended to say on treatment in one sentence.]

It was evident that a proper understanding of such a fundamental matter in livestock improvement as healthy reproduction needed, to prevent catastrophes arising such as doubtless would have been avoided by the old experienced breeders, a sufficient knowledge of the rapidly expanding fields of study represented by animal ecology, genetics, endocrinology, and nutrition. Moreover, the problem needed to be regarded as a "whole" one, in the sense that it needed to be fully viewed in its own setting from the divergent standpoints of all these studies.

There were consequential developments and implications, relevant to our better appreciation of the situation, which it would be well to foresee. Trials had now been carried out in keeping milking animals out of doors, all the year round, as in the Hosier system. It was a striking phenomenon that sterility and other breeding troubles in such animals were reported to be very low indeed. Again they needed to be mindful of certain rapid advances in applied science, particularly in the "dehydration" (not ordinary desiccation) of perishable foods. "Dehydrated" foods were so rid, they were assured, of their natural moisture content that on reconstitution afterwards by the mere addition of water they resumed their original appearance and qualities. They had already been made familiar with the subject in the now current domestic use of dehydrated eggs, which had been a valuable war-time contribution from America to our food needs. It was not impossible that technical progress would advance so that in time dehydration would be applied economically to fresh milk. He did not need to dilate upon the change that would then take place in the breeding and veterinary outlook. Open-air maintenance, all the year round, would then become a sounder plan to adopt, so far as the health and vigour of the bovine species was concerned, with breeding to take place in the "natural" season (as in New Zealand), if the milk secured during the normal season of rich herbage growth could be readily dehydrated and then stored for winter consumption. Furthermore, it was difficult to foresee how this country, in any other way, could compete with the great pastoral countries of the world, including America, when peace returned, should dehydration of milk become a satisfactory engineering and economically justified undertaking.

Dr. Chang added his appreciation of the work that has been done in every part of the world by the British veterinary surgeon and his appreciation of the value of the present conference. He pointed out the importance of international co-operation for the improvement of livestock and for the control of animal diseases in order to build up a world of plenty. It was widely realised that after the war a great effort to improve the livestock and to control the animal diseases of the world must be made if the utmost were to be done for the peoples who were starving or suffering from various degrees of malnutrition. The way of approach was the dissemination of education to the people who ought to be able to use it: the value of the work of the Extension Service of America in rendering information available to workers throughout the states could not be over-estimated.

The Reply

Professor Robert Rae, in reply, said that so many points had been raised in the discussion that he could not possibly attempt to reply to them all but he wished to say how much he had enjoyed the various contributions. He would confine his reply to one or two points only. He had been interested in two statements made by Dr. Bakker. One of these referred to the enormous volume of information locked up in milk recording societies, etc., of which the fullest use had not been made. It always seemed to him that was a medium whereby further information could be collected which would well repay examination and study.

The other point related to in-breeding. He had purposely left that out of his paper, but he spent the first three months of this year in America, when he visited some 14 States and saw a considerable amount of the research work that was going forward. One most interesting example was an investigation into in-breeding which was being undertaken in California with Jerseys. This work had extended now over a period of 25 years. It was a long-term experiment and he hoped some interesting information would come from it.

Another point was the undesirability of stressing single objects to the detriment of others, the over-emphasis on milk, for example, or whatever it might be. He remembered a competition in which young farmers judged the animals, and one particular cow was regarded as apparently outstanding. All the judges put it first except one young fellow, who put this cow at the bottom of the list. Afterwards he was curious enough to ask him why he had placed the cow in that position and the reply of the boy was: "Well, did you have a look at its feet? How could you expect a cow with feet like that to walk a mile up to the byre twice a day?"

Dr. Hignett had spoken concerning the bull breeding schemes, and he noted his interesting remarks. The basis of selection was individual cows, not necessarily the herd. As for Professor Miller's questions, he thought that the question of whether genetics or environment was of greater importance could be debated at length,

(*Concluded at foot of col.* 1, *page* 440)

THE VETERINARY RECORD
November 6th, 1943

IMPROVEMENT OF LIVESTOCK

DURING the last few decades of the nineteenth and the first three decades of the twentieth century, Great Britain built up a reputation as the world's stud farm. The general excellence of livestock on the better farms at home far exceeded the best in the so-called "livestock importing countries," and as soon as the great problems of long distance sea transport of valuable animals were solved, the flow of export of superior animals of all breeds from our shores developed to great dimensions. Shorthorns, Herefords and Aberdeen-Anguses crossed the Atlantic to be followed by the dairy breeds; our horses of the heavy and light breeds and even ponies, went to Canada, Australasia, India, South Africa and in large numbers to the European countries; most breeds of British sheep, many breeds of pigs and large numbers of poultry have been sent overseas almost to the ends of the earth, and even sheep-dogs have played their part—a big part—in the development of livestock industries in many parts of the world.

The direct result of the export of this huge quantity of livestock upon the quality of the animals in overseas territories has been marked. There are now few countries in the old world or the new which do not owe much to at least one imported British breed. In many, the imported animals have founded a new breed or race, *e.g.*, Polled Durhams in U.S.A.; in others, the imported animals have been basically responsible for grading an indigenous "scrub" stock into one of superior merit, *e.g.*, Shorthorns in the Argentine. Attempts to grade up indigenous stock have not, it is true, always been successful because in certain countries, *e.g.*, India and parts of Africa, where the environment is conspicuously alien in respect of climate, soil, or the prevailing parasitism, it has had a deleterious effect—immediate or delayed—in respect of disease resisting qualities or in respect of general stamina and vigour. In such territories the sounder long-term policy has been to improve the existing stock by judicious selective breeding amongst themselves. In most countries, however, this has fortunately not been found to apply and the contribution made by British pedigree stock has been outstanding.

In these countries improvement was at first rapid and spectacular, but as the importation of high-grade animals continued and as the numbers of improved stock in each territory increased so that more and more rigid selection could be practised to eliminate the inferior, so the rate of improvement began to decrease. "Grading up," when well under way, was followed as always by diminishing returns in each generation, and the quality of the herds improved by constant crossing began to approach somewhat to the quality of the British breeds. As the years have passed, improvement has continued, so that now in some of the importing countries the general level of the livestock is equal to, and in a few individual breeds is definitely superior to, those of the same breed at home. This is perhaps more especially noticeable in those countries which are the most favourably suited to livestock production—New Zealand, parts of Australia, South Africa and some areas in the U.S.A. or Canada. Much as we in Britain may dislike to believe this, it is nevertheless true and should be fully appreciated.

We must also recognise one more important factor in this development. Most of the livestock importing countries have framed for themselves progressive livestock policies, these having been often elicited by the economic advantages in the world's markets (and especially the select British market) to be obtained by adopting such policies. The place occupied before the war by Danish bacon, New Zealand mutton, butter and cheese, or by Argentine beef, illustrates the results achieved by an organised industry embodying planned policies and making the fullest use of local natural advantages of soil, climate or situation.

So far as could be judged by the trends of the livestock export trade before the war, there seemed no indication that export saturation-point had been reached except perhaps with some few breeds of sheep of waning popularity. To cater for the export trade, pedigree breeders constantly strove for and achieved improvement independently and by means which were essentially based upon the art of livestock breeding and management rather than upon scientific method. Science in fact lagged far behind. Neither its limitations nor its advantages in this field were fully realised. Various livestock improvement schemes were introduced from time to time, generally to aid the small owner, but they were often voluntary, and frequently were applied either half-heartedly or irregularly. It followed that while we possessed at home undoubtedly the best animals in each breed, we also possessed some of the worst, and we had in addition on many commercial farms a mass of heterogeneous cross-breds of all varieties.

Thus far we have merely recapitulated history: it remains to ask—what of the future? At once certain important questions must be faced. Will Britain retain or regain her pre-eminence as a livestock exporting country and as a corollary, will overseas countries, hitherto dependent upon a steady influx of British-bred stock, continue to import stock in future? Or, has the level of excellence so increased in these countries that imports of stock may cease without resulting deterioration in relation to market needs? Has the constant export of high-grade stock from Britain begun to drain our home reservoirs of the best "blood"? Will it be found that many overseas environments can so satisfy genetic potentials that new blood from Britain is no longer needed? Will the stimulus of a specialised British market for livestock food products continue to make it worth while for overseas producers to replenish their breeding stock from Britain? Will home production for the home market assume far greater importance than hitherto? Will the

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but they were really complementary. Feeding could only produce moderate results from a poorly bred cow, but on the other hand no matter how well bred a cow might be she could not produce her potential yield of milk unless she was efficiently fed and managed. Professor Miller's other question concerned the possible expansion of livestock and the saturation point. There they were on very debatable ground which raised all manner of political questions. From a nutritional point of view we could with advantage increase our livestock numbers above the pre-war figures. An increase in the *per capita* consumption of liquid milk was an obvious desideratum. There was, however, a limit to the number of animals we could feed from home produced produce and post-war expansion was bound up with a resumption of the import of feeding-stuffs.

With one point which Mr. Mitchell had raised he was in complete agreement, namely, the necessity for doing the young stock well. The criticism which Mr. Mitchell had laid against the small farmer in this respect might be extended to cover other people, for some of those who had really good herds did not for some reason do their young stock well.

Finally, he was extremely pleased to hear the remarks of the last speaker concerning the work done in various American states in the dissemination of intelligence by means of the Extension Service. He had the greatest admiration for the American intelligence service to farmers. It was first-class and he had been very much impressed with it. There was a great opportunity in this country at present through the technical services of the War Agricultural Committees, for keeping every farmer in as close touch as possible with what had been discovered by experiment and experience.

discriminating taste of the British public change?—or will it, after years of rationing and control, be satisfied with larger quantities of lower grade foodstuffs? What will be the effect of demands from the devastated countries in Europe and Asia upon world livestock production and in particular upon British livestock resources?

These are weighty questions and for answers to some of them we need to await further developments. The Minister of Agriculture has recently indicated that we are now deficient by about one million of the number of animals we require, though he did not specify which they were. No doubt remains, however, that British livestock has still a great part to play in national and international trade and economy, and that it must be maintained and improved by every means in our power. Vigorous and far-sighted policies are urgently needed, and must be formulated with wisdom and understanding. All those who have a concern for the future prosperity of British livestock, the veterinary profession no less than others, must ensure that everything possible is done to effect maximum improvements in breeding, rearing, feeding, management and control of disease.

Professor Rae has laid the profession under deep indebtedness to him by drawing our attention to the great need there is to strive to raise the level of the general average of our livestock to as near the level of the best as may be possible, and by indicating some of the ways in which we can assist. His paper, published in this issue and read together with the stimulating discussion which it provoked, will serve to renew the interest of those who were present at the Congress and, we hope, to arouse the interest of those who could not attend.

We commend the paper and its discussion to our readers for most careful consideration. There is a great opportunity before us and a wide field of endeavour. Our livestock must always be maintained as one of our greatest national assets and the veterinary profession has its own extremely important part to play in improving their health and controlling their diseases.

ALKALI THERAPY WITH SULPHADIAZINE

Laboratory and clinical studies have shown that the oral administration of sulphadiazine is apt to cause crystalluria and certain renal reactions. The urinary precipitate consists usually of acetylsulphadiazine, but free sulphadiazine may appear in the urine after the intravenous injection of the sodium compound. It was decided, therefore, by D. R. Gilligan and co-workers (*J. Amer. Med. Ass.*, 1943, **122**, 1160) to try the effects of giving alkali to 350 patients who were receiving daily doses of 4 to 6 grammes of sulphadiazine. On the basis of clinical studies, 15·6 grammes daily of sodium bicarbonate divided in six doses of 2·6 grammes (40 grains) administered every four hours is recommended as the dosage required to maintain the urine neutral or slightly alkaline during sulphadiazine therapy in adults. Sufficient fluid should be given to provide a daily urinary output of 1,500 mils. or more. In place of sodium bicarbonate, such organic sodium compounds as the lactate or citrate may be used in equivalent quantities; thus the required dose of sodium lactate is one-third greater and that of sodium citrate one-fifth greater than that of sodium bicarbonate. It was found that this adjuvant alkali prevented the precipitation of sulphadiazine and acetylsulphadiazine.—*Pharm. J.*

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CLYDESDALE HORSE SOCIETY

The Council of the Clydesdale Horse Society have decided to offer the Cawdor Cup for males and the Cawdor Cup for females to the Glasgow Agricultural Society for competition at next year's Glasgow Stallion Show. The trophy for stallions has been competed for at this event during the war years, but no competition for the Cawdor Cup for females has taken place since 1939, when it was competed for at the Edinburgh H. & A. S. Show. The membership of the Clydesdale Horse Society is increasing rapidly, and at the last Council meeting 106 new members were elected.

CLINICAL COMMUNICATION

Acute Nicotine Poisoning in Poultry

CAMPBELL DICKSON, M.R.C.V.S.
Gidea Park, Romford

History.—A short while ago one of my clients who keeps a small number of laying hens and pullets decided to dress his birds against ectoparasites, preparatory to rehousing them in fresh pens. The treatment adopted was suggested by an article in one of the weekly journals and advocated the application of nicotine to the underside of the wings and tail feathers. Commercial nicotine solution was used—the percentage as stated on the label being 92 to 95. One dab of the solution on the end of a match stick was applied to the axillae and tail feathers. As each bird was treated it was transferred to the fresh house and 16 had been so dressed before anything amiss was noted. At this stage I was consulted and gave instructions to have the birds washed in soapy water pending my arrival.

Symptoms.—I reached the premises within 20 minutes and found three pullets already dead. The remainder were in advanced stages of prostration. Each showed paralysis of wings and legs; dyspnoea was very marked and complete respiratory failure seemed imminent. The birds appeared to have been unable to move and had collapsed almost where they were set down.

Treatment.—In view of the rapidity of the onset of symptoms very little hope of saving any of the birds was entertained. A 1 per cent. solution of tannic acid in spirit was swabbed liberally on the parts which had been dressed. The birds were then propped up in a line against the wall of the house. By means of a measured pipette 10 minims of spirits aether nit. (2 drs. in 2 oz. of water) was given each bird in turn. When the last one was reached the procedure was repeated until the 2 oz. of stimulant had been used.

Two hours later the birds appeared to be responding to treatment and many of them were able to stand.

During the night only one death took place and this was of an older hen which had been overlooked and which had not received any treatment beyond the initial washing. The remaining twelve birds were considerably improved and were scratching for food within 18 hours. Thereafter recovery was uneventful except that the pullets which were on the point of laying have not yet started.

Observations.—Some features of this case are worth noting. It is recognised that nicotine is absorbed extremely quickly and there is abundant proof here. The actual amount applied was very small, but nevertheless it was sufficient to bring about toxic symptoms almost immediately. In the case of one bird death ensued 45 minutes after application while two more died in less than an hour.

In conclusion, it may be noted that the treatment, although empirical, was successful in saving the bulk of the flock.

ABSTRACTS

[The Value of the Tuberculin Test in Cattle affected with Extensive Lesions of Tuberculosis. Doyle, T. M. (1943.) *Vet. J.* **99**. 64.]

Doyle carried out an investigation on the value of the tuberculin test in the diagnosis of advanced cases of bovine tuberculosis. A considerable literature on the subject has been reviewed which reveals the conflicting results obtained by other workers. For the present survey, 25 animals, clinically affected with tuberculosis and condemned under the Tuberculosis Order (1925), were subjected to tests with a Cambridge synthetic medium tuberculin, a similar product issued from the U.S.A. Bureau of Animal Industry and with a broth tuberculin. Of 25 animals examined, 24 gave positive reactions while the only animal failing to react was tested with a single tuberculin. *Post-mortem* examination on eleven of the animals confirmed the presence of extensive infection while five others showed infection either in the sputum or milk.

The author points out that the former adverse criticism of the tuberculin test was based on the results obtained from the use of tuberculin of low potency, whereas with synthetic tuberculins now employed, reactions may generally be expected unless the animal itself is in an anergic state. S. J. E.

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[Sulphanilamide in the Treatment of Group C and Group G Streptococcus Infections. Mouse Experiments. Stableforth, A. W., Hignett, S. L., and Roach, R. W. (1943.) *Vet. J.* **99**. 42.]

The method selected for determining the value of sulphanilamide consisted firstly in selecting strains of Group C and G, which were

highly virulent for mice. If by preliminary test the average lethal dose of strains was not of the order of 10 to 1,000 organisms, the strains were passaged through mice until the virulence was enhanced. In this connection, the method adopted for Group C strains was to inject mice intraperitoneally with broth cultures and to passage further the strain recovered from the heart blood. In the case of one strain, 17 passages were required in order to acquire an ALD of ten organisms.

The virulence of Group G strains, which on isolation were usually of lower virulence than Group C, was increased by a novel method; mice were inoculated with falling dilutions and those dying as a result of injecting the smallest number of organisms were selected for recovering the strain and further passage. In this way the most highly virulent variants were propagated.

In testing the value of sulphanilamide an initial dose of 20 mg. given by the oral route simultaneously with the injection of organisms was followed by successive doses of 10 mg. at intervals up to 30 hours.

A table showing the mortality in the treated mice and in controls shows that a very significant protective value was attained. The authors point out, however, that inconsistent results may arise in mouse experiments which are related to variation in the virulence of a single strain.

An interesting observation was also made on an attempt to increase the virulence of Group B strains in mice.

S. J. E.

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[The Eradication of Sheep Ticks, *Melophagus ovinus*, by One Dipping in Dilute Derris-water or Cube-water Dips. Cobbett, N. G., and Smith, C. E. (1943.) *J. Amer. vet. med Ass.* **103**. 6-10.]

Cobbett and Smith have carried out a number of field tests on 1,068 sheep near Colorado Springs, Colo., and on 8,703 sheep near Las Vegas, New Mexico, with dilute derris—or cube-water dips—to find out if complete eradication of *Melophagus ovinus* was possible. Their results show that one immersion in freshly prepared dips consisting of 4 or 6 oz. of either derris or cube powder per 100 gallon water completely eradicated the insects. Not only was the dip lethal at the time of dipping, but it remained sufficiently long afterwards in the fleece to kill adults emerging from pupae not affected at dipping. In addition, the dip material in the fleece apparently prevented reinfestation from infested premises. It was not found necessary to hold the sheep in the dip for any specific period, but a thorough wetting of the fleece was ensured by completely submerging each animal at least twice during its passage through the dip bath. With this procedure recently shorn adult sheep and unshorn spring lambs carried out approximately ⅜ths gallon of dip per animal. The dips were easy to prepare, economical to use, harmless to the sheep and to their fleeces, and their efficiency was apparently unaffected by excessive amounts of extraneous materials entering the dip bath, by the degree of alkalinity of the water used in preparing the dip fluid, or by thorough soaking of the fleece from varying amounts of rainfall after dipping. The authors state that the cost and quantity of derris or cube powder required were very small and they recommend the use of only freshly prepared dips containing at least 6 oz. of either powder, with a rotenone content of 5 per cent., to each 100 gallons of water as a more rapid eradication is obtained with a dip of this strength and a more satisfactory margin of efficacy is provided.

J. N. O.

In its issue of October 9th, *The Estates Gazette*, which describes itself as the oldest journal devoted, among other interests, to agriculture, contributes a two-and-a-half column editorial of comment upon and quotation from the President's address to the annual meeting of the N.V.M.A. Expressing the hope that it will be widely read outside the profession, the *Gazette*, recognising that the co-operation urged by Dr. Wooldridge is a "two- or three-sided business in this case," stresses the necessity that his ideas of opportunity and service, of what the veterinary profession is capable of doing for the nation, should penetrate to the Government and its Civil Service as well as to the great army of farmers who, being the first beneficiaries, should be the most willing coadjutors. Since the recent introduction of the "panel scheme" for dealing with infections of dairy herds there has been a tendency on the part of the public to think that all is now well, but nobody can view with equanimity a situation such as Dr. Wooldridge describes. "One cannot but agree with him that if the Prime Minister's statement that 'there is no finer investment for any community than putting milk into babies' is to be interpreted in terms of agriculture and human medicine, then the animals supplying the milk must be healthy, clean and productive."

QUESTIONS IN PARLIAMENT

Bovine Tuberculosis

Brigadier-General Clifton Brown asked the Lord President of the Council whether enough owners of milk herds have been secured to carry out the Agricultural Research Council's field experiments to test their B.C.G. vaccine for the control of bovine tuberculosis; and whether these experiments, as far as they have gone, are proving successful?

Captain McEwen (Lord of the Treasury): I have been asked to reply. The Agricultural Research Council, with the collaboration of the Ministry of Agriculture and Fisheries, have been fortunate in finding sufficient herds to start the field experiments with B.C.G. vaccine, and further herds may be included in the future. The test is one which must last over five to six years, of which the present is the first. It is clearly much too early to reach any conclusions.

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Scientific Research

Rear-Admiral Beamish asked the Lord President of the Council whether he will invite the War Cabinet Scientific Advisory Committee to consider the general policy to be adopted in planning and financing scientific research in special fields which can be justified in the national interest and for which at present no method of approach or regular provision for support is available through existing official channels?

The Lord President of the Council (Mr. Attlee): I am satisfied that, in general, existing arrangements provide full opportunity for the consideration of any new scheme of scientific research which may further the national interest. In particular, the desirability of extending, where suitable, the fields of enquiry of the Department of Scientific and Industrial Research and the Medical and Agricultural Research Councils is kept well in mind. Whilst in these circumstances I see no point in asking the Scientific Advisory Committee to undertake a general review of the kind suggested, I should not hesitate to ask the advice of the Committee on such matters if the occasion arose. I am having enquiry made into the three particular instances which my hon. and gallant Friend has brought to my notice, but I may say at once that the importance of these topics has not been overlooked in the past.

Rear-Admiral Beamish: Is the right hon. Gentleman aware that his reply will give considerable satisfaction in many useful directions?

Sir H. Williams: Are the Government considering the possibility of establishing in this country anything comparable with the Mellon Foundation in the United States?

Mr. Attlee: I should require notice of that.

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Agriculture (Long-term Policy)

Major York asked the Prime Minister what steps His Majesty's Government intend to take in the immediate future to consult with the leaders of the agricultural industry on long-term agricultural policy?

The Prime Minister: I do not desire at the present time to make any statement on this subject.

Major York: Is my right hon. Friend aware that last December a statement was made on behalf of His Majesty's Government that these consultations would, it was hoped, take place in the new year?

The Prime Minister: I have nothing to add to the answer which I have just given.

Mr. De la Bere: I am a seeker after truth, and may I ask whether we may know what progress has been made, and when can we expect a pronouncement?

The Prime Minister: I should not be prepared to debate this matter at Question Time.

[A subsequent Ministerial pronouncement has, in fact, been made: see our Notes and News Columns.—*Editor.*]

Weekly Wisdom

I want you nevertheless to take as much care about your opinions as about your clothes and your bodies and your manners, and so be fit for the true "good society," that of cultured and thoughtful men and women.—J. M. Robertson, "Letters on Reasoning."

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Under the Ministry's 1943 stud goat scheme 117 were passed by inspectors at 114 centres, and 1,751 services were made and 1,650 allowed for premium.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Nov. 10th.—Meeting of the Scottish Metropolitan Division, N.V.M.A., at Moredun, 2.30 p.m.

Nov. 11th.—Special Meeting of the Eastern Counties Division, N.V.M.A., at Bury St. Edmunds, 2 p.m.

Nov. 12th.—Meeting of N.V.M.A. Committee to make nominations for Standing Committees, 1943-44, 36, Gordon Square, 11.30 a.m.

Nov. 12th.—Meeting of N.V.M.A. Finance and General Purposes Committee, 36, Gordon Square, 2 p.m.

Nov. 20th.—Second Annual General Meeting of the Society of Women Veterinary Surgeons, at the Conway Hall, Red Lion Square, London, W.C.1, 1.30 p.m.

Nov. 25th.—Meeting of the South-Eastern Division, N.V.M.A., at Maidstone, 2 p.m.

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PERSONAL

Births.—Buxton.—On October 12th, 1943, to Joan, wife of J. C. Buxton, M.R.C.V.S., of Bragleen, Woodland Way, Weybridge—a son.

Carnegie.—On October 18th, at Brampton Cottage Hospital, to Marjorie, wife of W. K. Carnegie, B.Sc., M.R.C.V.S., Brampton, Cumberland—a son.

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Marriage.—Buxton—Gardner.—At St. Mary's Church, Streatley, Berks, on October 23rd, 1943, by the Rev. J. Hughes, M.A. (Oxon), Anthony Buxton, M.R.C.V.S., younger son of Professor and Mrs. J. Basil Buxton, Childe Court, Streatley, to Jean Phillips Gardner, B.Sc., second daughter of Mr. and Mrs. James Gardner, 5, Rowand Avenue, Giffnock, Renfrewshire.

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Golden Wedding.—Rider—Mattison.—At St. Mary's Parish Church, Richmond, Yorks, November 6th, 1893, Joseph William Rider, M.R.C.V.S., to Emma Mattison. Present address: 271, Durham Road, Gateshead, 8.

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Mr. D. D. Ogilvie, B.Sc. (Edin.), M.R.C.V.S., has resigned from the service of the Ministry of Agriculture and Fisheries and has now taken up an appointment as Veterinary Advisory Officer with Imperial Chemical (Pharmaceuticals), Ltd., Hexagon House, Blackley, Manchester, 9.

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R.C.V.S. OBITUARY

Pethick, R. Sydney (retired), 33, St. Peter's Street, Tiverton, Devon. Graduated London, December 20th, 1888. Died October 17th, 1943; aged 77 years.

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ANIMAL HEALTH DIVISION'S RETURN TO LONDON

The Animal Health Division of the Ministry of Agriculture and Fisheries has returned to London from the Fernlea Hotel, St. Annes-on-Sea, and the Headquarters address, to which all communications should now be directed, is 99, Gresham Street, E.C.2; telephone number AVEnue 4616.

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MINISTER'S ANNOUNCEMENT ON AGRICULTURAL POLICY

In the course of a statement on agricultural prices and policy, in the House of Commons last week, Mr. R. S. Hudson, Minister of Agriculture, after announcing that the Secretary of State for Scotland and he proposed to discuss forthwith with the industry the question of the adjustment of prices, said: "In addition I am able to announce that the War Cabinet have authorised my Rt. Hon. Friend the Secretary of State for Scotland and myself to start discussions with representatives of the agricultural industry as to agricultural policy both in the transitional period immediately after the end of hostilities and in the post-war period. These discussions will be of an exploratory character and confidential; and reports will be made from time to time to the War Cabinet on their progress."

ROYAL ARMY VETERINARY CORPS

The following announcement is made in the issue of *The London Gazette* dated October 15th, 1943: To be Lts.—William Bruce, B.Sc. (294017), September 10th, 1943; David Richard Melrose, B.Sc. (294070), September 13th, 1943.

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LEGAL NOTES

Breach of Warranty in Sale of Horse

The potential danger of a "flare-up" of old-standing pleuritic lesions was demonstrated in an action—thus rendered of considerable interest to the profession—heard by His Honour Judge Forbes at Banbury County Court on September 17th, 1943. Damages were awarded in respect of a horse which, although apparently in the best of health at the time of sale, was so affected by the effects of previous disease that it had to be destroyed, and the deferred judgment on October 15th, awarding the amount claimed—£117 3s. 1d.—and costs, is likely to have an important bearing on the sale of animals.

The plaintiff was Mr. H. C. Barnes, of Glasshouse Fields, London, E., who sued Mr. H. E. Knott, of Hill Farm, Sandford St. Martin, for damages amounting to £117 3s. 1d. in respect of the cost and treatment of a bay gelding bought privately at Stow-on-the-Wold Fair on September 24th, 1942, for £95.

Mr. W. R. Rees Davies, for the plaintiff, said the horse was put up for auction but was not sold. Subsequently it was bought privately by Mr. Barnes, who paid the auctioneers for it by a cheque which included the prices of several other horses bought under the hammer. A condition of the sale was that all horses were warranted quiet and good workers and workably sound. All lots were at the risk of the purchaser at the fall of the hammer.

The gelding was sent to London by rail with other horses and was received at the plaintiff's premises, on Sunday afternoon, September 26th, by Mr. Barnes, who saw the horse was unwell and had a temperature of 104 degrees. Next morning it was examined by Mr. King, a veterinary surgeon, who found it had pleurisy. The auctioneers were notified immediately by telegram, letter and telephone, and a request for an extension of the warranty was made. No reply was received from the auctioneers and the telephone conversation produced no satisfactory result.

A horse not answering to the warranty was required to be returned within 24 hours of the sale, Sunday not counting. If the distance was too great then the auctioneers had to be notified within that time that the horse was being returned.

Further correspondence took place and it was later suggested that a veterinary surgeon should be appointed to examine the animal on behalf of the defendant, but again no reply was forthcoming until after the horse had been slaughtered.

Mr. W. S. King, M.R.C.V.S., gave evidence as to the condition of the horse on Monday, September 27th, until it was slaughtered on humanitarian grounds on November 27th. He said that as a result of the symptoms shown by the horse and the *post-mortem* examination, he was satisfied that the animal had an attack of pleurisy some time, perhaps six to twelve months, previous to the sale, and that this, plus the exposure and strain on the horse in the sale yard, when he understood the weather was unfavourable, had caused a "flare-up" of the old-standing pleurisy. The horse was suffering at the time of sale from a condition which would in its natural course be likely to render it less capable of any reasonable work.

Mr. H. E. Bywater, M.R.C.V.S., Chief Veterinary Officer and Horse Transport Manager, County Borough of West Ham, Hon. Referee on Meat Inspection to the War Office, said he saw the animal with Mr. King on November 27th and, as it appeared to be dying and there was dropsy of the fore limbs and sternal region, he considered it should be killed on humanitarian grounds. The pulse was very feeble, breathing was short and laboured. The next day he made a *post-mortem* examination on the carcase with Mr. King and his assistant. His *post-mortem* certificate (to which he spoke) showed that there was extensive pleurisy, with oedema of the sternal region and fore limbs. The left apical lobes showed pressure atalectasis. The right lung was firmly attached to the chest wall by old-standing adhesions which must have formed many months previously. There was a large quantity of clotted exudate in the chest, and the pericardium and diaphragm were attached to the thoracic walls, mostly by more recent adhesions, although there were also old-standing lesions between the pericardium and the diaphragm. Both kidneys were also markedly congested and about twice the normal size, and the liver was congested and about 1½ times the normal size.

He had had many years of experience in *post-mortem* examinations of all kinds of animals, including horses killed for human consumption; in meat inspection it was important, and usually easy with experience, to differentiate between recent and old-standing signs of disease. He considered the older adhesions had been formed many months previous to the date of sale, and was of

the opinion that the animal was, at the time of sale, in a condition which rendered it incapable of conforming to the ruling of Baron Parke (1842) as to soundness (quoted with the intimation that, in this case, adhesions constituted the "alteration of structure").

For the defence, Mr. H. M. Davies, Bridge Street, Banbury, said he bought the gelding in May, 1942, for £100. It had been loaned for some time to a farmer, and on October 23rd he washed it with cold water and then walked it to Banbury and put it on rail to Kingham after it had been ploughing during the earlier part of the day. Next day he walked it to the fair, a distance of about six miles, where it took second prize in the show. He trotted it a considerable distance at the fair during the show and for prospective buyers. It was in perfect health and had not the slightest illness between May and October, 1942. It had never been attended by a veterinary surgeon whilst in his care.

Mr. J. W. Farley, farmer, of Middleton Cheney, said Mr. Davies loaned him the horse for its keep some time previous to the fair. He worked the horse several times but found nothing wrong with it; it was sound whilst in his care.

Mr. W. Barlett, farmer, Little Burford, said he judged the horse and gave it second prize. He made a thorough examination of the gelding and found nothing wrong with it. He considered it a sound animal.

Judgment

His Honour, in giving judgment, said it was common ground between the parties that the conditions of sale contained in the printed catalogue applied to the sale of this horse although it was not sold by auction. The horses were sold with a warranty that they are quiet and good workers, free from vice, and will and are capable of fulfilling the description given. The effect of the clause was that this horse was warranted as being workably sound and as not having any infirmity or disease which rendered it incapable of reasonable work.

He found that the horse was, at the time of sale, incapable of reasonable work, by reason of pleural adhesions which were caused by pleurisy from which it had suffered some months previously, and that the warranty was broken. The defence did not deny the breach of warranty. Some evidence was given on behalf of the defendant with a view to showing that the horse appeared to be in good condition in the show ring, but he accepted the evidence of the plaintiff's witnesses who conducted the *post-mortem* examination and deposed to finding pleural adhesions some months old which rendered the horse liable to a "flare-up" of pleurisy and made it incapable of sustained work. Upon the day after the sale the horse developed a high temperature from pleurisy: its condition thereafter got worse, in spite of treatment; and it was slaughtered on November 28th.

The defence relied upon a condition of the sale that any horse returnable must be returned on the following day (Sundays not counting) unless the auctioneer gave instructions to the contrary whilst in the purchaser's possession; otherwise the purchaser would keep the lot with all faults. It was obviously impracticable to return the horse within the time limited by the clause. Apart from the cruelty of the proceeding, he thought that Mr. Barnes was probably right in saying that the journey would be likely to kill the animal, but the clause did not operate upon this case at all. It was confined to cases where the horse was returnable through not answering to the description in the catalogue. "Returnable" must mean "which the buyer has a right to return." The claim here was for a breach of warranty which would not have entitled the plaintiffs to return the horse whatever its condition.

Judgment was given for the amount in full plus costs.

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ANTHROPOLOGY AND THE COLONIES

On the occasion of the centenary celebrations of the Royal Anthropological Society held in London at the close of last week, Lord Hailey discussed the role of anthropology in colonial development, and said British colonial policy owed the doctrine of trusteeship to the same humanitarian movement as had secured the abolition of slavery when the Ethnological Society was founded. They might well feel to-day that this doctrine needed a more constructive interpretation; but there was no doubt of the influence it had exercised both on our policy and in the formation of international opinion.

Lord Hailey defined three stages in the development of dependencies—first, the introduction of law and order and the provision of rudimentary services; secondly, the stage in which the more essential requirements had been met and the problem was to assist indigenous communities to advance their social life and better their standards of living; thirdly, the stage when the progress made in social life was judged to have afforded an adequate foundation for political advance.

In the first stage colonial administrations would have gained much if they had possessed a fuller knowledge of the customs of the people and their traditional institutions. Lack of this kind of knowledge had been responsible for many administrative errors. But these must be distinguished from errors due to a more fundamental cause—namely, the failure to appreciate the place which indigenous institutions and those of European civilisation respectively must occupy in building the future life of those communities.

Many colonial administrations had realised that indirect rule demanded an intensive study of native institutions, and that study of this type required the special technique of the anthropologist. The interest of colonial research workers demanded that the pursuit of their studies should be placed on a more secure basis, and that these studies should be encouraged in our universities.

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MINISTRY OF AGRICULTURE NEWS SERVICE

Cattle on the Panel.—Farmers who have taken advantage of the National "panel" scheme for their cattle number over 6,000. This means that more than a quarter of a million animals are receiving regular visits of inspection—and treatment when necessary—by veterinary surgeons at a moderate scale of fees. The "panel" enables the individual farmer to help combat the wastage of milk and cattle brought about by mastitis, sterility and contagious abortion—a loss that has been computed at 200 million gallons of milk a year and a monetary value of £20,000,000. Johne's disease, through impaired quality of milk, causes a further loss to the nation of 100 000 tons of butter fat.

Silage from Aftermath.—No grass need be wasted; in many parts of the country it can easily be turned into a valuable winter food by ensiling. At this time of the year, good aftermath will be available, especially from "seeds" or young leys. An acre of seeds aftermath will give about four tons of greenstuff and this should make about three tons of good silage capable of producing 300 gallons of milk without coupons. Ten acres will suffice for 20 head of stock. It is advisable to add 20 lb. of molasses to each ton of grass ensiled. Good silage made from leafy aftermath grass or clover is a safe and healthy food, one that will keep up the colour of winter milk and provide an excellent source of protein for stock not getting cake.

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The attention of farmers is drawn to the terms of an Order, recently issued by the Minister of Agriculture and Fisheries, by which no horse, ass or mule may be permitted by the owner thereof or his agent to be carried in a road vehicle if owing to "infirmity, illness, injury, fatigue or any other cause" it cannot be so carried without unnecessary suffering. Contravention of the Order is an offence under the Diseases of Animals Acts.

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The Principals of both Glasgow and Edinburgh Colleges of Agriculture were due to retire shortly. Principal Paterson, Glasgow, has had an extension of office for a year.

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The Scottish Association of Certified and T.T. Milk Producers has decided to proceed with two preliminary schemes for the training of milking staffs in separate districts of Ayrshire.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Parasitic Mange*	Sheep Scab	Swine Fever
Oct. 1st to 15th, 1943 ...	13	—	—	11	19
Corresponding period in—					
1942 ...	10	29	—	7	23
1941 ...	12	1	1	3	17
1940 ...	29	5	—	1	307
Total Jan. 1st to Oct. 15, 1943	231	15	6	126	420
Corresponding period in—					
1942 ...	262	531	26	138	373
1941 ...	343	259	16	154	984
1940 ...	439	33	15	130	3,943

NOTE.—The figures for the current year are approximate only.
* Excluding outbreaks in Army Horses.